...Index to Contents, August, 1939...

The Annual Index for each volume is published in the December issue

Air Conditioning
New Jersey Gains in Air Conditioning 9

Bridges
Awards for Attractive Municipal Bridges .. 13

Business and Industrial Development
Trends in Number of Retail Stores 41
The Trailer—Business Builder and Civic Problem 67

Business Machines
How Much? 7

Cartoons
The Perennial Problem of Public Spending 5
Transit Modernization 39

City Manager Plan
Recent City Manager Appointments 91

Conventions
Conventions—When and Where 115

Federal Works Agency
Set-up of the New Federal Works Agency .. 5

Finance and Taxation
Street Upkeep Needs Money 13
Kentucky County Debt Act Sustained 68
Division of State and Local Government Designated by the Director of the Census 70
The Municipal Bond Market 91
Eight Principles of Municipal Purchasing Shown in Survey 93

Fire Prevention and Control
Atomizing Fires 7
False Alarms Stopped 7
Have You Enough Hose? 15
Where's the Fire-Alarm Box? 15
Old Water-Works Reservoir a Fire Truck Repair Shop 60
Niagara Falls Supersedes Automatic Fire-Alarm 63
Going to Blazes in Small Towns 68

Government and Administration
Set-Up of the New Federal Works Agency 5
Division of State and Local Government Designated by the Director of the Census 70
Towards a Code of Conduct for Local Government Officers 89
City Employees May Participate in State Retirement System in California 93

Health
Infant Mortality Less in New York City .. 11
Health Instruction in Local Communities 11
Mosquito Extermination Commission Tractor 11

Housing
Dearborn to Have Modern Subdivision .. 35
Zoning Group Housing Projects 44
Housing and Planning Courses and Conferences 91

Legal Decisions
Zoning and Planning Notes 107
Court Decisions Affecting Municipalities .. 109

Lighting, Outdoor
Safety Lighting 15
Niagara Falls Brightens at Negligible Cost 101
Modern Street Lighting in 10 Easy Lessons 103
Sodium Light Shows Danger and Divider. 105
Mounting 10½ Feet Higher 105
Versatile Mercury Vapor 105
Mounted Only 14¼ Feet High 105
Better Street Lighting on Present-Day Budgets 119

Motor Equipment
Tractor Laying Water Pipe, Boulder, Colo. 9
Mosquito Extermination Commission Tractor 11
Grader Street Maintenance 13
Repairing Truck Breakdowns Before They Occur 46
Snow-Plow and Wrecker Truck 117
New Roller Improvements 117
Picking the Right Tire for Trucks and Tractors 123

News and Illustrations
Hints for Officials 117

Parking Meters
Parking Meters in 17 Pennsylvania Cities. 49

Parks and Recreation
Milwaukee's Midsummer Festival 50
Modern Swimming Pools Reduce Drowning Tolls 52
A Dismal Swamp Becomes a Park 73
Lawn Irrigation from Concealed Heads .. 119

Planning and Zoning
Dearborn to Have Modern Subdivision .. 35
Zoning Group Housing Projects 44
Put Underground Structures in Streets Systematically 53
Modernizing Downtown Shopping Areas 75
Housing and Planning Courses and Conferences 91
Zoning and Planning Notes 107

Police
Organized Effort Cuts Juvenile Delinquency Rate 62 Per Cent 59

Power Plants
Municipal Plant Quickly Outgrown 56

Publications
Municipal and Civic Publications 111

Public Utilities
Better Municipal Utilities 7
Put Underground Structures in Streets Systematically 53
The Old Municipal Steam Electric Plant. 57
The Manufacture of Asbestos-Cement Pipe 123

Public Works
Set-Up of the New Federal Works Agency 5
Winchester, Mass., Prepares Long-Range Public Works Program 95

Safety
Hazard of Gasoline Storage Tanks 15
Guards for Guy Wires 125

Sewers and Sewage Disposal
Weighing Sewage Sludge 58
Problems of Sewage Treatment—II 61
New Compost Mixer Aerator and Loader. 121

Street Construction and Maintenance
Money from Budget for Street Upkeep .. 13
Grader Maintenance, Indianapolis; Minneapolis 13
Tar Pre-Mix for City Streets 37
Put Underground Structures in Streets Systematically 53
Street Repair Costs 64
Former Race Track Becomes Circular Boulevard 72
New Roller Improvements 117
Modified Tractor Shovel Announced 121
A New Mixer of the Non-Tilting Type 125

Swimming and Wading Pools
Modern Swimming Pools Reduce Drowning Toll 52
Municipal Swimming Pool Has Asphalt Macadam Bottom 65

Traffic Control and Facilitation
Front Cover 7
Queens for a Day 7
Beaver Dam's Parking Area 71
"Protected" Highways Urged for Essex County, New Jersey 79
Strict Bicycle Regulations Passed 93
Signal Discourages Speed at Crossroads .. 95
One-Way Streets 97

Trailers
The Trailer—Business Builder and Civic Problem 67

Transportation
Know the Trolley Coach 39

Waterfronts
Cleveland Improves Its Lake Front 51
The Prospective "Venice of America" 72

Water Supply and Purification
Tractor Laying Water Pipe, Boulder, Colo. 9
Hydrant Maintenance in Binghamton 9
Where the Water Goes in Household Use. 9
New Jersey Gains in Air Conditioning 9
Promotional Literature Out with Bills 9
Water Softening at Hollywood, Florida .. 42
Old Water-Works Reservoir Now Fire Truck 60
Restoring Water-Main Capacity 66
Water Rates and Service Charges—VI 81
Floatless Control of Liquid Levels 117
Notes on Stabilizing Lime-Softened Water 117
The Manufacture of Asbestos-Cement Pipe 123

Zoos
The Reptile Garden in Tulsa's Zoo 72

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EDGAR J. BUTTENHEIM, President
HAROLD S. BUTTENHEIM, Editor
THEODORE REED KENDALL
Secretary and Engineering Editor

M. V. FULLER, Associate Editor
ALDEN W. WELCH, Research Editor
HERBERT K. SAXE
Treasurer
MYRON MacLEOD, Advertising Mgr.
PRENTICE C. FORD, Asst. to President

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BRANCH OFFICES
Daily News Building, Chicago
TOM DIX, Vice-President
648 Hanna Building, Cleveland
GEORGE S. CONOVER, Vice-President
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In THE MUNICIPAL INDEX AND ATLAS (the annual reference volume of data and condensed catalogs published by the American City Magazine Corporation) readers will find statistical material, and articles on a wide variety of municipal and public works subjects, not published in the monthly issues of the magazine.

See pp. 17, 18, 20, 111, 113 for catalogs and publications on municipal and civic subjects

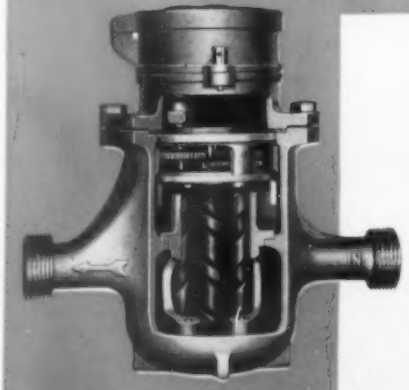
For Index to Advertisements see page 130

in LUBBOCK, TEXAS

AIR VIEW OF LUBBOCK, TEXAS

CAMPUS AND BUILDINGS TEXAS TECHNOLOGICAL COLLEGE

PITTSBURGH IMO METERS



Lubbock, a thriving city of over 30,000 persons, is located in the vast South Plains of Texas. The territory within a radius of three hundred miles makes Lubbock the financial, educational, trading and transportation center. It may well be proud of the fact that each year for the past eight years it has won the official title, "The Cleanest City in Texas", and that its tax rate is the lowest of any city of equal size in the state of Texas. Lubbock owns its water system. The supply comes from an inexhaustible underground water sheet and is obtained through wells at an average depth of 150 feet.

In keeping with their reputation for efficiency and foresight, city officials long ago were looking for a rugged quiet water meter that would effect savings by accurately measuring the low flows (flows less than 1 g.p.m.). They found their answer in the unique Pittsburgh IMO Water Meter. Built to specifications which guarantee an accuracy of 98% at 1/4 g.p.m., and 90% at 1/12 g.p.m., the Pittsburgh IMO measures those low flows that conventional meters will not record. Considering the proven fact that the average household uses 30% of its water at a rate of flow less than 1 g.p.m., the Pittsburgh IMO Water Meter will facilitate an important increase in total revenue. The complete story is in Bulletin W-529. It will pay you to write for it.

Remember — PITTSBURGH IMO METERS WEAR IN WHERE OTHERS WEAR OUT

PITTSBURGH EQUITABLE METER COMPANY
MERCO NORDSTROM VALVE CO.
NEW YORK · BUFFALO · PHILADELPHIA · KANSAS CITY · TULSA · LOS ANGELES — Main Offices PITTSBURGH, PA. — DES MOINES · CHICAGO · COLUMBIA · MEMPHIS · OAKLAND · HOUSTON

OVER 750 CUSTOMERS IN 46 STATES OF THE UNION

Set-up of the New Federal Works Agency

John M. Carmody Appointed Administrator

When President Roosevelt advised Congress, on April 25, 1939, that "I find it necessary and desirable to group and consolidate under a Federal Works Agency those agencies of the Federal Government dealing with public works," he transferred the Works Progress Administration, the Public Works Administration, the Bureau of Public Roads, and the United States Housing Authority, to the new Agency. In addition, a Public Buildings Administration was set up, composed of the Public Buildings Branch of the Procurement Division of the Treasury Department, the Branch of Public Buildings Management of the National Park Service, and the Space Control Division in the District of Columbia under the National Park Service. The functions of selecting sites for public buildings in the Capital and the determination of priority of construction and enlargement of public buildings in Washington were also transferred to the Public Buildings Administration.

On June 23, President Roosevelt nominated John M. Carmody, then Administrator of the Rural Electrification Administration, to be Administrator of the Federal Works Agency. Mr. Carmody was quickly confirmed by the Senate and assumed the duties of his new post on July 1.

As of mid-July, Administrator Carmody has made the following appointments: Alan Johnstone, formerly counsel for the special Senate committee investigating unemployment and relief, General Counsel; Col. George Babcock, Management Engineer; Forrest Allen, Chief, Division of Information; and Foster Adams, Chief, Research and Statistical Section.

Administrator Carmody has stated that he is not planning a large overall staff in the FWA, but prefers a small coordinating unit, working through the existing machinery of the FWA agencies.

Functions of the Constituent Agencies

The new Federal Works Agency combines under one Administrator those agencies of the Federal Government dealing with public works and administering Federal grants or loans to state and local governments for the purposes of construction. Their major functions are:

1. The WPA (recently re-named the *Works Projects Administration*) provides work for needy persons on useful public projects. The sum of $1,427,000,000 was recently made available to WPA for its program for the 1939-1940 fiscal year. The provisions of the Emergency Relief Appropriation Act of 1939 will reduce the number of WPA jobs available for the needy and will tend to lower wages on relief projects in the North while raising them in the South.

2. The *Public Works Administration* has financed, through loans and grants, public works having an estimated total cost of approximately four billion dollars. Construction under its current program is expected to reach a peak this September and be completed by next summer.

3. The *United States Housing Authority* has as its major purpose the administering of loans and grants-in-aid to local public housing authorities for construction of low-cost housing—a part of the housing field which private enterprise has been unable to reach with a profit. The entire $800,000,000 of funds provided for this Authority under the 1937 U. S. Housing Act have been ear-marked.

4. The *Public Roads Administration* manages the Federal roads program in cooperation with state and local governments.

5. The *Public Buildings Administration* handles the allocation of space to Federal agencies and the construction of Federal buildings. The construction of the new Social Security Building and of the new War Department Building will be undertaken by the Public Buildings Administration.

Pending Legislation

A pending amendment to the United States Housing Act of 1937 authorizes the United States Housing Authority to issue an additional $800,000,000 of its own bonds to provide funds for extending its housing program.

As this issue of The American City goes to press, two major measures affecting the Federal Works Agency are pending before the Congress. The Works Financing Act of 1939, if enacted, will make available $2,390,000,000 for increasing employment through a program of loans and recoverable investments. Included in this total is $500,000,000 to be used by the Public Roads Administration for express roads and bridges, and $350,000,000 to be used by Public Works Administration for loans for public works. There is a big job to be done in building attractive useful public works through employing men eager to work and idle capital.

Administrator Carmody has set up his headquarters on the sixth floor of the North Interior Building, 18th and F Streets, Washington, D. C.

Forrest Allen,
Chief, Information Division, FWA

The Perennial Problem of Public Spending

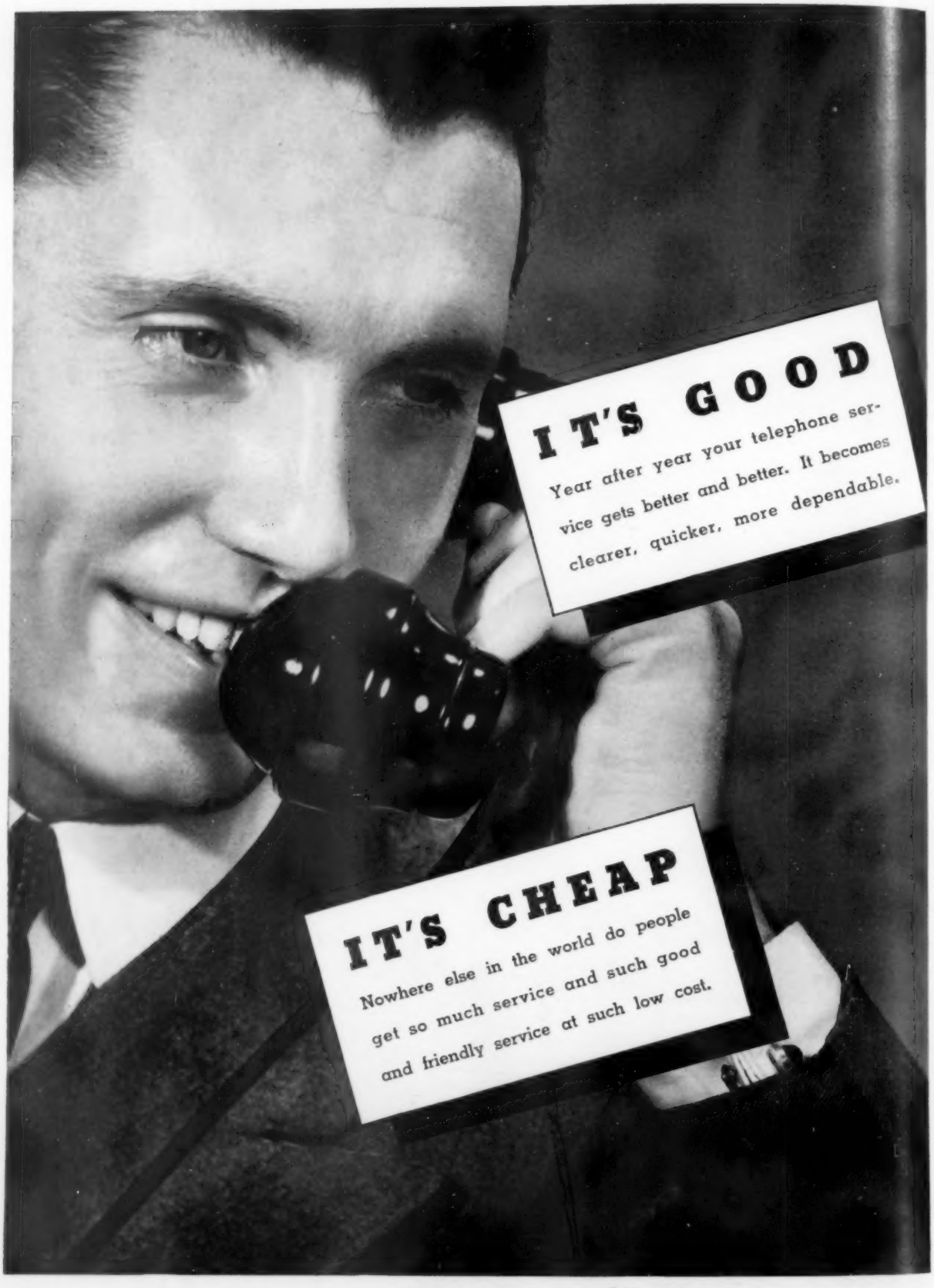
THE TWO DEMAND NOTES

Ratepayer (*reading over his letter to "The Times"*). "Sir, why should London wait? Are we always to lag behind Paris and Berlin? We *must* have improvements, at whatever cost."

The Same (*later*). "What! Want *me* to pay a bill like that! I call it simply monstrous!"

[*Becomes incoherent*

Punch — *November, 1906*


IT'S GOOD
Year after year your telephone service gets better and better. It becomes clearer, quicker, more dependable.
IT'S CHEAP
Nowhere else in the world do people get so much service and such good and friendly service at such low cost.

BELL TELEPHONE SYSTEM

• The Bell System cordially invites you to visit its exhibits at the New York World's Fair and the Golden Gate International Exposition, San Francisco.

Mention THE AMERICAN CITY—it helps.

Our Municipal Notebook

Front Cover

THE UPPER PICTURE on the front cover of this issue shows the red light against traffic on Broad Street, Newark, N. J., and traffic flowing east and west on Market Street.

The large number of mass transportation vehicles suggests delay and imminent confusion; but the lower picture shows the free flow on the green light. The quick pick-up and speed of modern coaches permit them to compete with and not impede passenger traffic.

On Broad Street there is no parking between 4 and 6 P. M. The fast, quiet trolley coaches and diesel and gas buses use the curb lanes, while private motor traffic flows along the center. Traffic Inspector Matthew J. Bolger of the Newark Police Department and Martin Schreiber of Public Service Coordinated Transport both assert that congestion has thus been abated even in the rush hours.

Queens for a Day

As BETWEEN motorcycle officers and ladies, it is probable that motorists have no doubt that the latter constitute the fair sex. But on Thursday of the recent fifth annual Safety Week at Sacramento, Calif., the two were one and the same thing, for it was Women's Day, when more than 200 women patrolled the downtown district on motorcycles or on foot. The women motorcycle officers for a day, uniformed and badged, were recruited from the Sacramento Cyclettes, Inc., and the Fort Sutter Motorcycle Club Auxiliary. They get acquainted with the officer's point of view, and the drivers get a new slant.

Atomizing Fires

THE HISTORY of development in any technical field is to fit the solution ever more closely to the problem. In the fire-protection field the problem is to extinguish with the least damage. Until quite recently, chief attention was given to drowning the fire. Then thought was given to playing the hose as lightly as the degree of fire permitted. Even now, not anywhere near enough use is made of vapor nozzles which snuff out fires with minimum damage. Equipped with today's efficient gas or oxygen masks, and if needful an asbestos suit, the fireman takes his fog nozzle to the *source* of the fire and dilutes the burning vapors until they are too lean to burn. Frequently the fireman does not have to enter the hot area, but by means of a long-handled applicator inserts the right nozzle into cellar, attic, a vault full of municipal records, or a ship bilge. Fire Chief Ralph Thompson of Stockton, Calif., for instance, carries two Fognozls on each of his eleven trucks.

False Alarms Stopped

FALSE ALARMS are causing concern among officials of many cities, says the International City Managers' Association. Much effort is expended to curb the practice, which in some cities accounts for as many as 20 per cent of the total alarms. Portland, Ore., and Cambridge, Mass., attached this sign to fire-alarm boxes: "Think—A False Alarm May Cost a Life." Chicago offers $200 for information leading to conviction. New York State has a minimum fine of $10 or 10 days or both. Boston placed the Gamewell Arestolarm shrieker on fire-alarm boxes and, say the City Managers, "It has been found that wherever these sirens were placed, false alarms have practically stopped."

Better Municipal Utilities

WHEN PEOPLE SPEAK of "the municipal plants," they are lumping together, according to the Census Bureau's most recent figures, 257 steam, 523 diesel, 120 hydro, and 63 mixed generating stations of two or forty or more years of age. Some are efficient and many are not. It would be an excellent thing for the entire electric utility industry if all these plants were modernized and on their toes. They would then truly serve as yardsticks while serving their communities most efficiently.

J. D. Ross is best remembered for the constructive work he did in building up Seattle's electric system. No one can mention the Jamestown, N. Y., municipal electric utility without paying tribute to former Mayor Samuel A. Carlson, whose lifetime is identified with that accurate yardstick and local asset. On July 17 last, Alfred Dewey Webster, head of the Orrville, Ohio, municipal utilities, died from injuries sustained in a fall in a swimming pool. Many were the improvements he made in his fifteen years of service to the local utilities, whose electric system is in competition with a private utility. "His" steam plant is not one of those criticised by Dr. M. J. Zucrow on page 57 of this issue. There are other noteworthy exceptions.

The point is that not only do many municipal electric systems need to be modernized, but that when this work is well planned and carried through it is appreciated both locally and nationally.

How Much?

WHAT is the unit cost of a local kwh? Of a ton of refuse collected, burned? Of a ton of snow removed? Of a truck-mile? Lewiston, Maine, is the latest searcher for a practical comprehensive cost system. This is an ideal job for accounting and calculating machines to figure and for tabulating machines to classify.

Sacramento Women Enforce Laws for a Day

Water Service Improved with Elevated Storage

WITH power costs averaging only 1¼c per k.w.h. it might seem that the water works department at Salina, Kansas, would have found little to be gained from the installation of the 1,000,000-gal. radial-cone bottom tank shown above, but this was not the case. On the contrary, Salina, like hundreds of other municipalities, has found that adequate elevated storage is easily worth its cost, even disregarding the usual savings in power.

In the first place, pressure conditions are greatly improved throughout the entire distribution system. Secondly, minimum pumping equipment is required and peak loads can be carried by surplus drawn from the elevated tank. At Salina, the storage is sufficient to carry the entire load for over ten hours at the average rate of consumption. A third important factor is an ability to utilize existing transmission mains, which need only handle average pumpage instead of peak loads.

Another benefit, which often may be the most important, is the improved fire protection secured through elevated storage. The required fire flow can be provided economically in this manner.

We shall be glad to cooperate with city officials and water works engineers by supplying information and estimating data on elevated tanks to meet individual requirements. Address our nearest office.

CHICAGO BRIDGE & IRON COMPANY

Chicago.....2127 Old Colony Bldg.
New York.....3308-165 Broadway Bldg.
Cleveland.....2236 Rockefeller Bldg.
Detroit.....1501 Lafayette Bldg.
Philadelphia..1616 "1700" Walnut St. Bldg.
Boston.....1501 Consolidated Gas Bldg.
Birmingham.....1502 N. Fiftieth Street
Dallas.....1406 Liberty Bank Bldg.
San Francisco.....1033 Rialto Bldg.
Houston.....2919 Main Street
Tulsa.....1625 Hunt Bldg.
Los Angeles.....1403 Wm. Fox Bldg.

Fabricating plants in CHICAGO, BIRMINGHAM, and GREENVILLE, PA.

Water-Works Operation

HAULING PIPE AND BACKFILLING TRENCHES ARE JUST TWO OF THE MANY JOBS PERFORMED BY THIS 35-HP CATERPILLAR TRACTOR WITH TRAIL-BUILDER OWNED BY THE BOULDER WATER DEPARTMENT, BOULDER, COLO.

This 22-inch steel line with Dresser couplings was laid near Nederland, Colo., with the tractor digging the trench and backfilling. The work was done at an elevation of 8,000 feet

Hydrant Maintenance in Binghamton

THE BUREAU OF WATER, Department of Public Works, Binghamton, N. Y., purchases, installs and maintains all fire hydrants and is not reimbursed by the city for this service. The fire hydrants are oiled and greased annually by employees of the Bureau of Water and are painted annually by the Bureau. The hydrants are tested bi-monthly during the summer months, and repairs are made where necessary. A crew of sixteen men tests all hydrants daily during the winter. All hydrants located on dead end mains are blown monthly by Water employees.

Where the Water Goes in Household Use

THE Springfield, Ill., Water-Light Department has been distributing the table reprinted below to its consumers, since it contains information valuable to the average household. It shows the relative amount of total average water consumption that can be accounted for by household use:

Use	*Per Cent of Total*
Laundry	4
Sprinkling	3
Auto wash	1
Drinking	5
Toilet flush	45
Bathing	30
Kitchen	6
Cleaning	3

New Jersey Gains in Air Conditioning

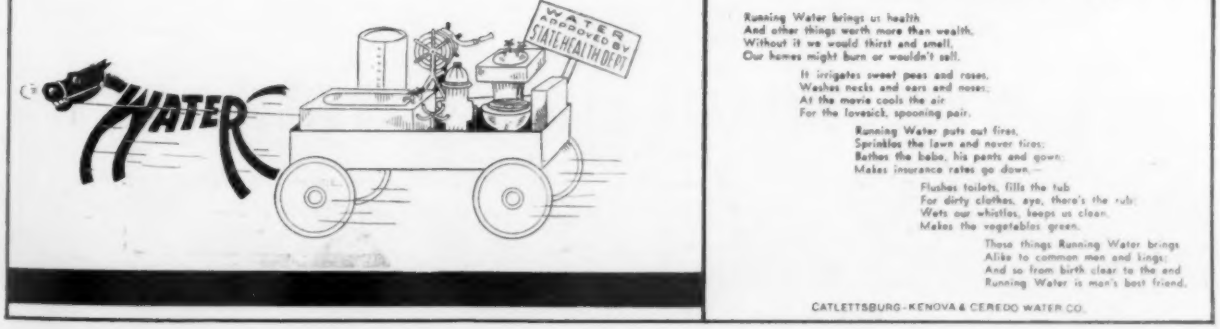
AIR CONDITIONING increased during 1938 in the 51 communities in Bergen and Hudson Counties served by the Hackensack Water Co., according to a recent report. Eighteen new installations with a total refrigeration capacity equivalent to 164.25 tons of ice per day were put in service.

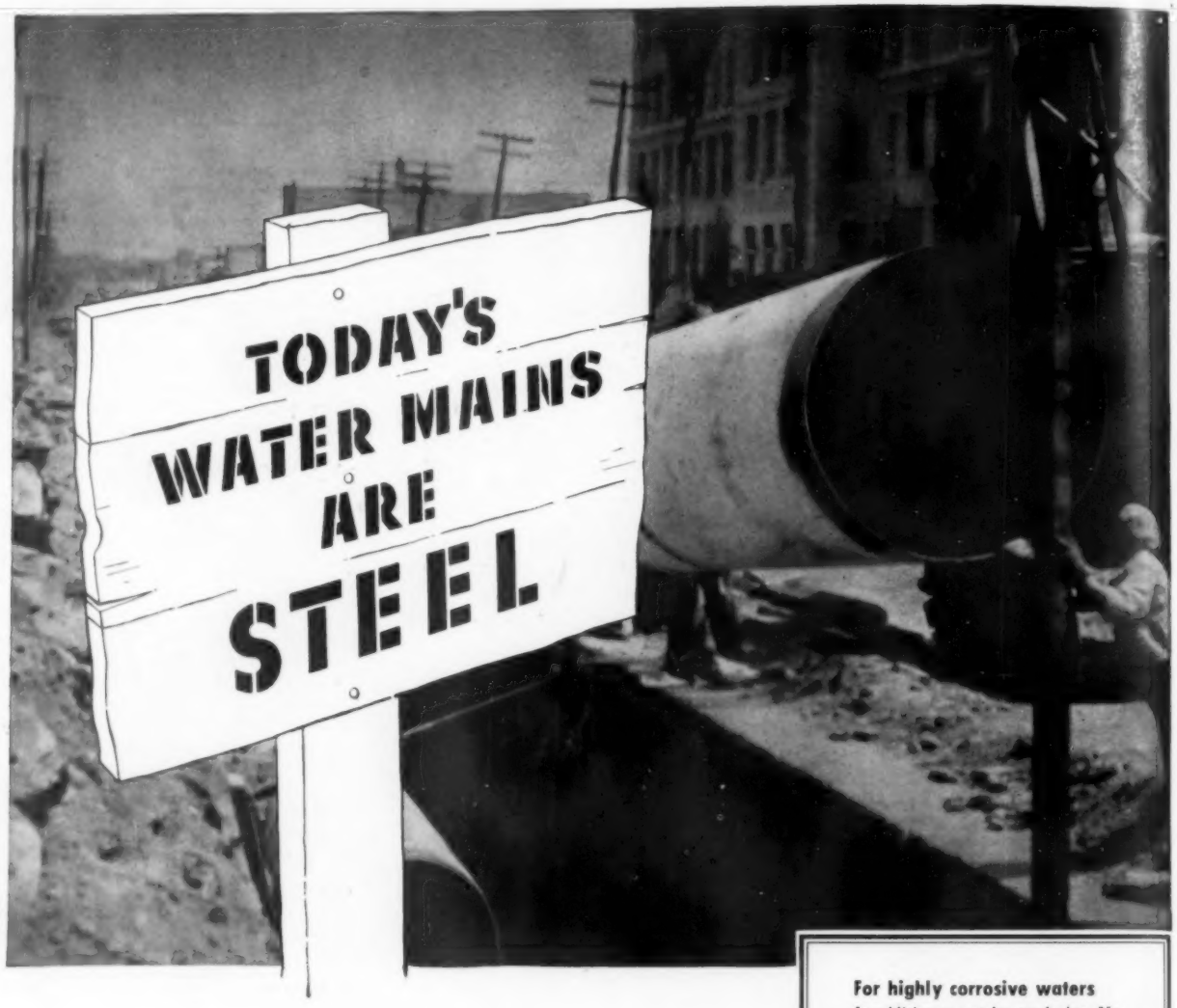
Ten of the new systems are located on the main street of Hackensack, where the first system was installed in a theater. The remainder are scattered through the larger towns in Bergen County and northern Hudson County. Installations in small specialty shops such as shoe stores and dress shops predominate, with restaurants second. Office buildings are next in number, but run to larger capacities. Only one residence is included in the 1938 list of installations. One of the office buildings of rather large size was equipped with a water-conservation device which will greatly reduce its water consumption and operating cost.

The primary interest of the public, of water purveyors and of the manufacturers of summer air-conditioning equipment is of course in the development of adequate facilities for preventing wasteful use of water. Based on careful estimates from comparison of meter readings where air-conditioning systems are installed, the Hackensack Water Co. found that a total of about 32,000,000 gallons is used annually for this purpose. This quantity is equivalent to about one average day's consumption, or about 0.25 per cent of the total annual consumption. In view of the recorded trends of increase, no concern is felt in regard to the ultimate increase in demand for water in the northern New Jersey territory.

Simple air circulation meets the requirements of the average person in the mid-Atlantic states. The theaters generally find that blowers circulating uncooled air furnish a noticeable degree of comfort to their patrons, and many residents have installed exhaust fans in the attic or upper story of their houses to circulate cooler night air up through the building during hot weather.

An Interesting Piece of Promotional Literature Used by the Catlettsburg-Kenova-Ceredo Water Co. for Mailing Out with Bills


RUNNING WATER BRINGS MANY THINGS-
WATER
WATER APPROVED BY STATE HEALTH DEPT
What does RUNNING WATER bring?
Running Water brings us health
And other things worth more than wealth.
Without it we would thirst and smell,
Our homes might burn or wouldn't sell.
It irrigates sweet peas and roses,
Washes necks and ears and noses;
At the movie cools the air
For the lovesick, spooning pair.
Running Water puts out fires,
Sprinkles the lawn and never tires;
Bathes the babe, his pants and gown;
Makes insurance rates go down.—
Flushes toilets, fills the tub
For dirty clothes, aye, there's the rub;
Wets our whistles, keeps us clean,
Makes the vegetables green.
These things Running Water brings
Alike to common men and kings;
And so from birth clear to the end
Running Water is man's best friend.
CATLETTSBURG-KENOVA & CEREDO WATER CO.



WITH many cities now putting their water systems on higher pressures, the need for the security of steel pipe is becoming even more acute. Only steel can offer you the extra strength you need for these water pressures. It gives you the most service per dollar of cost—the greatest safety that money can buy.

Steel Water Mains cost less to lay because steel pipe is lighter and easier to handle and is available in longer lengths—lengths as great as 40 feet, that reduce the number of joints per mile.

Steel Water Mains cost less to maintain because steel is not only strong, but also flexible. It prevents sudden ruptures, and the resultant repair and damage costs. Traffic vibrations, earth settlement, and even sudden shocks can never cause disastrous, abrupt failures.

Steel Water Mains have smooth surfaces that are ideal for the application of various dips and coatings, which may be needed where soil conditions are highly corrosive.

Write for complete information on NATIONAL Steel Pipe for Water Mains. The NATIONAL organization is equipped to serve you speedily, efficiently, and in exact accordance with your requirements.

For highly corrosive waters

In addition to regular steel pipe, NATIONAL produces a special cement-lined pipe, "DUROLINE," specially designed to give long service under extremely corrosive water conditions. In DUROLINE, the interior surface of the pipe is completely sealed against corrosion—giving you the perfect combination of the strength of steel, and corrosion prevention at nominal cost.

For high water pressures

For handling abnormally high water pressures, we recommend NATIONAL Seamless Pipe, a pipe that is made without welds, by piercing solid billets of highest quality steel. This pipe removes all possibility of localized weakness, and assures full wall strength throughout. NATIONAL Seamless is available in sizes up to 24-inch O.D. Write for complete data.

NATIONAL TUBE COMPANY

PITTSBURGH, PA.

Columbia Steel Company, San Francisco, *Pacific Coast Distributors* · United States Steel Products Company, New York, *Export Distributors*

UNITED STATES STEEL

When you write for that catalog, kindly mention THE AMERICAN CITY.

Protecting the Citizens' Health

Infant Mortality Less in New York City

THE 1938 Report of the Health Commissioners of New York City records a further decrease in infant mortality. For the first time in the city's history the death rate of infants under one year has been pushed below 40 per 1,000 births. Inasmuch as the infant mortality rate is generally regarded as an excellent indicator of a community's health, the one which is not affected by the composition of the population, this decline in the infant mortality rate confirms the conclusion that the health of the city had never been as good as it was during 1938. Following is a summary of the infant mortality during the past nine years:

CITY OF NEW YORK, BIRTHS AND INFANT DEATHS, 1930-1938 INCLUSIVE

Year	Live Births	Infant Deaths	Per 1,000 Births
1930	122,811	7,030	57.2
1931	115,621	6,427	55.6
1932	109,878	5,594	50.9
1933	103,500	5,508	53.2
1934	101,239	5,287	52.2
1935	100,657	4,790	47.6
1936	98,507	4,490	45.6
1937	101,988	4,457	43.7
1938	102,045	3,909	38.3

Health Instruction in Local Communities

COMMUNITIES are fast becoming conscious of public health. This has been brought about to a large extent by the city health conservation contests sponsored by the Chamber of Commerce of the United States in cooperation with the American Public Health Association. These contests were started about ten years ago in the effort to determine which cities of various populations were carrying on the most effective community public health programs to prevent premature deaths and economic losses from unnecessary illness. Year after year these have continued with local committees representing a cross-section of the community taking the responsibility of studying services and presenting the results to the National Chamber of Commerce. Cities that have entered the contest once invariably continue to compete, since the awards are based, not on comparative results in cities of like size, but on the progress made to attain higher standards in public health each year.

Such contests have been invaluable because they have been the means of holding the mirror up to nature to see there a true reflection of facilities available, services rendered and results accomplished. Most valuable of all has been the stimulation of public interest in community health. No health officer can accomplish results alone. He must have the support of all the people that make up his community. To do this, the public must be well informed on his policies and the acceptable methods of disease control and health promotion. They must be made to feel that their share in his health program is essential to its successful completion.

A study of the 1938 annual reports by health officers in Connecticut showed that in at least 42 Connecticut towns and cities the health officer met with local groups interested in health to plan the year-round program, according to an article by Elizabeth C. Nickerson in the *Connecticut Health Bulletin*. Health officers in increasing numbers are using legitimate means of informing the public about public health facilities available and about the newer advances in preventive medicine and sanitary service. That many health officers are not yet fulfilling this obligation to their community is shown by the moderate number reporting use of the accepted methods of popular health education:

Talks	67
Posting bulletins in library, town hall, etc.	69
Distribution of leaflets	97
Newspapers	63
Visual (films or exhibits)	34

Discussing health with different groups in a community presents one of the best means of keeping the public well informed, since each member of a group is in turn in close touch with other people, and thus there is a widening circle which forms an excellent channel for the dissemination of health information. If these talks take the form of a well-planned series on a given health subject, so much the better, for this allows for concentrated effort and more opportunity for a better understanding of the subject.

The distribution of health leaflets is another medium for health instruction. Such leaflets should be selected for:

(a) Accuracy and simplicity of statement;

(b) Suitability of group to be reached;

(c) Forcefulness of message.

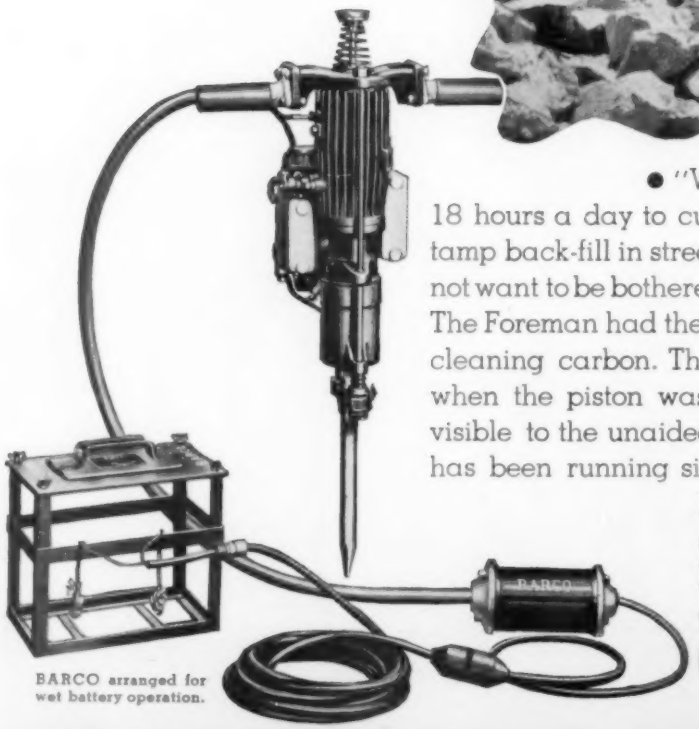
The leaflets should be kept up to date to present the current practices in disease control, the best plan being to make use of a series covering the different diseases. The distribution of about three pamphlets for each case reported should be the common practice for all the major communicable diseases, including typhoid fever, scarlet fever, smallpox, diphtheria, tuberculosis, and syphilis and gonorrhea. In maternity hygiene and infant and pre-school hygiene, at least one leaflet or series of letters for each birth recorded, and one for each live birth and pre-school child, is recommended to keep the public well informed on these phases of public health in each community. The public should also be kept informed on sanitation activities and food and milk control.

Talks have added value when some illustrative material is used in connection with them, in the form of motion picture films, film strips, or slides, or posters and charts. It has been estimated that half the people are eye-minded and the other half are influenced more through the ear. To make a more lasting impression, it is wise then to make use of visual aids for those to whom these appeal and to add emphasis to the spoken word. Direct contact with the public through personal talks and illustrative material is of course supplementary to the educational value of professional field workers who are immediately concerned with the special problem at hand.

The contribution of the daily press to health instruction is noteworthy, and more and more health officers are securing the cooperation of their local press to present health information to the public. The press has shown willingness to assist if material is timely and authoritative and is presented in form which will fit in with their standards for press releases. The local health officer owes the press a debt of gratitude for this valuable contribution to his health program, and in turn he should be ready to give frequent news items that will arouse interest in his work. Acceptable standards require that satisfactory health items should appear in the local press at least three times a year on syphilis and gonorrhea, tuberculosis, infant and pre-school hygiene.

A Nassau County, N. Y., Mosquito Extermination Commission Tractor and Wing-Plow Outfit Working Near Jones Beach, N. Y., and Averaging Five Complete Drainage Ditches Every Seven Hours

A Construction Superintendent SAYS:



BARCO arranged for wet battery operation.

● "We are driving our hammer here 16 to 18 hours a day to cut frost and rock both, also using it to tamp back-fill in streets where traffic is heavy, where we do not want to be bothered with future settlement of the back-fill. The Foreman had the piston out of the hammer this morning, cleaning carbon. The grooves made by the turning lathe when the piston was turned out in manufacture are still visible to the unaided eye, after all these months of use. It has been running sixteen hours a day all through November and December, and ran two hundred hours per month through September and October. We still think it is a great machine."

BARCO MANUFACTURING COMPANY
1803 Winnemac Ave., Chicago, Ill.

BARCO *Portable* GASOLINE HAMMER

Streets and Bridges

Awards for Attractive Municipal Bridges

WHEN the announcement of the Eleventh Annual Awards for the most beautiful bridges built during 1938 was made by the American Institute of Steel Construction on June 22, two municipal bridges received honorable mentions, and one, the Lafayette Avenue Bridge across the East Channel of the Saginaw River at Bay City, Mich., received first place on the movable bridge class. This structure, which cost $380,000, was designed by Hazelet & Erdal and was fabricated for the city of Bay City, Mich., by The R. C. Mahon Co. It was completed December 5, 1938, and opened to traffic two days later. The bascule span is 185 feet long and the approach spans 96 feet 10 inches, and 107 feet 8 inches.

The two municipal bridges receiving honorable mention, one in Class B and the other in Class C, are the Chain Bridge over the Potomac River between the District of Columbia and Virginia at Washington, D. C., owned by the District of Columbia; and the Burnham Park Pedestrian Bridge at the foot of East 47th Street, Burnham Park, Chicago, Ill., designed by the Engineering Division, Chicago Park District.

The Chain Bridge, costing $352,529 for the superstructure, was designed by Modjeski, Masters and Case, and fabricated for the District of Columbia by the Bethlehem Steel Co. It was completed and opened to traffic on June 17, 1938. There are six spans 172 feet long, and two 160 feet long.

The Burnham Park Pedestrian Bridge cost $14,700 and was built for the Chicago Park District from its own design by the Duffin Iron Co. It was completed September 6, 1938, and opened to traffic September 17. The bridge has a 115-foot span.

The award for the most beautiful monumental bridge was given to the Middletown-Portland Bridge at Middletown, Conn., which cost $3,000,000 and was designed by William G. Grove under the direction of L. G. Sumner, Engineer of Bridges and Structures, Connecticut State Highway Department. The award for the most beautiful medium-sized bridge went to the Capital Bridge across the Kentucky River at Frankfort, Ky. This bridge, which cost $329,316.39, was designed by the Bridge Department of the Department of Highways of Kentucky and erected by the Bethlehem Steel Co. The award for the most beautiful small bridge was given to the bridge over the Middle Fork of the Flathead River at Belton, Mont. This bridge cost $74,815.25 and was designed by the Montana Highway Department and erected by the Pittsburgh-Des Moines Steel Co.

Street Needs Most Money from Budget for Upkeep

STREET repairs and street cleaning represent the largest part of the public works maintenance cost in the big cities of the country, according to a survey of the American Public Works Association. For these two functions 16 of the cities will pay out approximately $15,000,000 in 1939.

While appropriations for street cleaning in these cities were increased $200,000 over 1938, the funds set aside for street repair were reduced more than $1,000,000, which is false economy for cities which are attempting to defer needed street repairs. The annual bills for all maintenance activities in seven of the cities surveyed run well over $1,000,000 each for the past two years. Other functions usually included as maintenance activities are the repair of bridges and other structures, sewer maintenance and cleaning, traffic signs and the inspection of pavement cuts.

Topping the cities surveyed, in outlay for total maintenance expense, is Cleveland, Ohio, which estimates for 1939 an expenditure of $3,345,751, or an increase of $300,000 over 1938. Detroit, Los Angeles, Philadelphia, Milwaukee, Baltimore and Washington, D. C., are other cities spending more than $1,000,000 for public works maintenance in 1939.

For the smaller cities in the group, 1939 maintenance appropriations run as follows: Toledo, Ohio, $577,196; Oakland, Calif., $399,920. The maintenance bill for Syracuse, N. Y., is estimated at $250,362, but street-cleaning figures are not included. Atlanta estimates 1939 expenditures at $358,470, and Louisville expects to spend $459,813, excluding structure maintenance and pavement-cut inspection. St. Paul will pay $283,761 for street and sewer maintenance and cleaning.

Snow-removal appropriations play a sizable role in street-cleaning costs of the northern cities. In Rochester, for example, $224,000 will be spent for ordinary street cleaning in 1939, and in addition an appropriation of $360,000 has been made for snow removal. Toledo has added $22,500 for snow removal to its current appropriation of $193,000 for street cleaning. Detroit's 1939 street-cleaning bill is estimated at $494,191, plus $92,459 for snow removal.

Grader Maintenance in Indianapolis

AS THERE is a reasonable mileage of earth and gravel streets in Indianapolis, Ind., the city owns five graders which are used for their maintenance, and recently purchased an Adams motor grader for this service. The graders are operated by one man each, but a city truck with a driver and two helpers patrols in front of each grader so that they can pick up the large stones which may be brought up on the street by scarifying, and they also clean inlets. This crew picks up the accumulated dirt which may gather from grading the intersections, and uses this to fill any low places in the street which is being graded.

Motor Grader Owned by the City of Minneapolis, Minn., Scarifying an Old Oil Surface Preparatory to Re-treatment

ANNOUNCING

THE GAMEWELL AUTOMATIC UNIT

For Fire Alarm Central Alarm Stations of Intermediate Capacities

AUTOMATICALLY

Repeats Box Alarms to Fire Stations
Conditions System to Receive Alarms from Broken Circuits
Regulates and Supervises Electric Current Supply
Maintains Batteries in Fully Charged Condition

Gamewell's latest contribution to the public safety possesses the following outstanding advantages:

A Typical Automatic Unit equipped with master control and four box circuits.

FIRST Compactness without sacrifice of accessibility.

SECOND Higher operating efficiency. The compact grouping obviously contributes to efficiency of operation.

THIRD Economy of floor space.

FOURTH Economy of maintenance. Simplified equipment and fewer operating parts than in prior designs.

FIFTH Superior functional characteristics.

SIXTH Greater system capacity. The emergency grounding feature increases the capacity of fire alarm systems by 50%. In systems of this type it is permissible to install 30 boxes on each circuit as compared with only 20 boxes per circuit in other types of systems.

SEVENTH Non-Interference and Successive Features. The effectiveness of these features in the Automatic Unit between circuits is equal to that of the fire alarm boxes themselves.

DESCRIPTIVE BULLETIN MAILED ON REQUEST

THE GAMEWELL COMPANY

NEWTON UPPER FALLS MASSACHUSETTS

Public Safety

Hazard of Gasoline Storage Tanks

MANY CITIES are receiving requests for permits for underground storage tanks of 10,000 gallons and larger capacity in connection with filling stations. These often are located in or near high-value areas, sometimes as part of a parking area. The desire for this large storage is to enable a saving to be made in the transportation of the commodity, and also because the cost of the tank installation is less than that of several tanks of the same total capacity.

The principal hazard of these large underground storages is in connection with the delivery of the material. In some cases the operator desires to unload direct from a railroad tank car. This should never be permitted in any closely built area, because of the hazard introduced by the amount of liquid in the tank car and the general method of delivery, which is by gravity from a bottom outlet.

A growing demand for these 10,000-gallon storages is due to a more general use of large-capacity tank trucks for the transportation of petroleum products. Where delivery is by tank truck, only such trucks should be used as have been *specially licensed by the fire prevention bureau of the city*, and periodic inspections of the trucks and the methods of unloading should be made. Because of the congestion often found around and at filling stations, use of trailers is inadvisable and should be prohibited in mercantile areas.

The underground tank should be provided with an indicating device to show the amount in storage and extreme care must be taken not to overflow the tank.

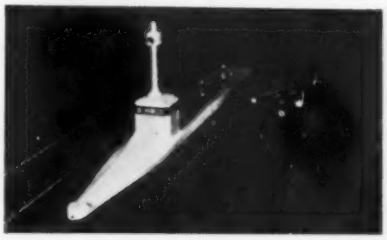
Cities which do not have restrictive regulations on storage and handling of gasoline should adopt suitable requirements as found in the Suggested Fire Prevention Ordinance recommended by the National Board of Fire Underwriters.

GEORGE W. BOOTH,
Chief Engineer, National Board of Fire Underwriters.

Have You Enough Hose?

IN REPORTING on the March 31, 1939, fire involving nearly a whole block in Sandusky, Ohio, the National Board of Fire Underwriters says: "The need for an ample supply of hose was again emphasized, as a total of 2,000 feet was lost."

Philadelphia Practices Pedestrian Safety



Will Install Nine of These

PHILADELPHIA'S Pedestrian Campaign reduced fatalities from 29 in May, 1938, to 11 in May, 1939, the lowest monthly death record in 22 years, writes Robert A. Mitchell, Traffic Engineer, whose practical recommendations for pedestrian protection appeared on page 135 of the May issue of THE AMERICAN CITY.

Where's the Fire-Alarm Box?

AT 5:30 on a recent Sunday, the janitor of a four-story Cranston, R. I., apartment housing 57 families discovered fire and telephoned the alarm. One block away was a box which if pulled would have brought a full complement of companies with the aerial equipment to rescue the occupants of the upper floors. Instead, there was inadequate response and delay in getting the needed equipment onto the job. The building was gutted, and four lives were lost and twenty-five persons injured.

What is the answer? Obviously, to use fire-alarm boxes wherever available. The best way to encourage this use is to make them available wherever they belong. Bloomfield, N. J., has a better alarm system than most cities of its size and condition necessitate, and all its 128 boxes are Gamewell Three-Fold; but the 852 "phantom" box locations explain (1) why so many of the 500 annual alarms are by telephone, and (2) that the large headquarters capacity is really needed though not utilized. Niagara Falls, N. Y., now installing a Class A manual fire-alarm system, has 258 actual boxes and 630 phantom boxes, and only 202 of last year's 632 alarms were sent by box. "Phantom" box locations are not haphazardly established by fire departments; they are established because fire hazards exist at those points. And where fire hazards exist, the substance and not the shadow of protection is needed.

The boxes are of course the fire-alarm system itself. All the other equipment in headquarters is merely to handle the box calls. Without boxes, the central station is a museum of useless equipment.

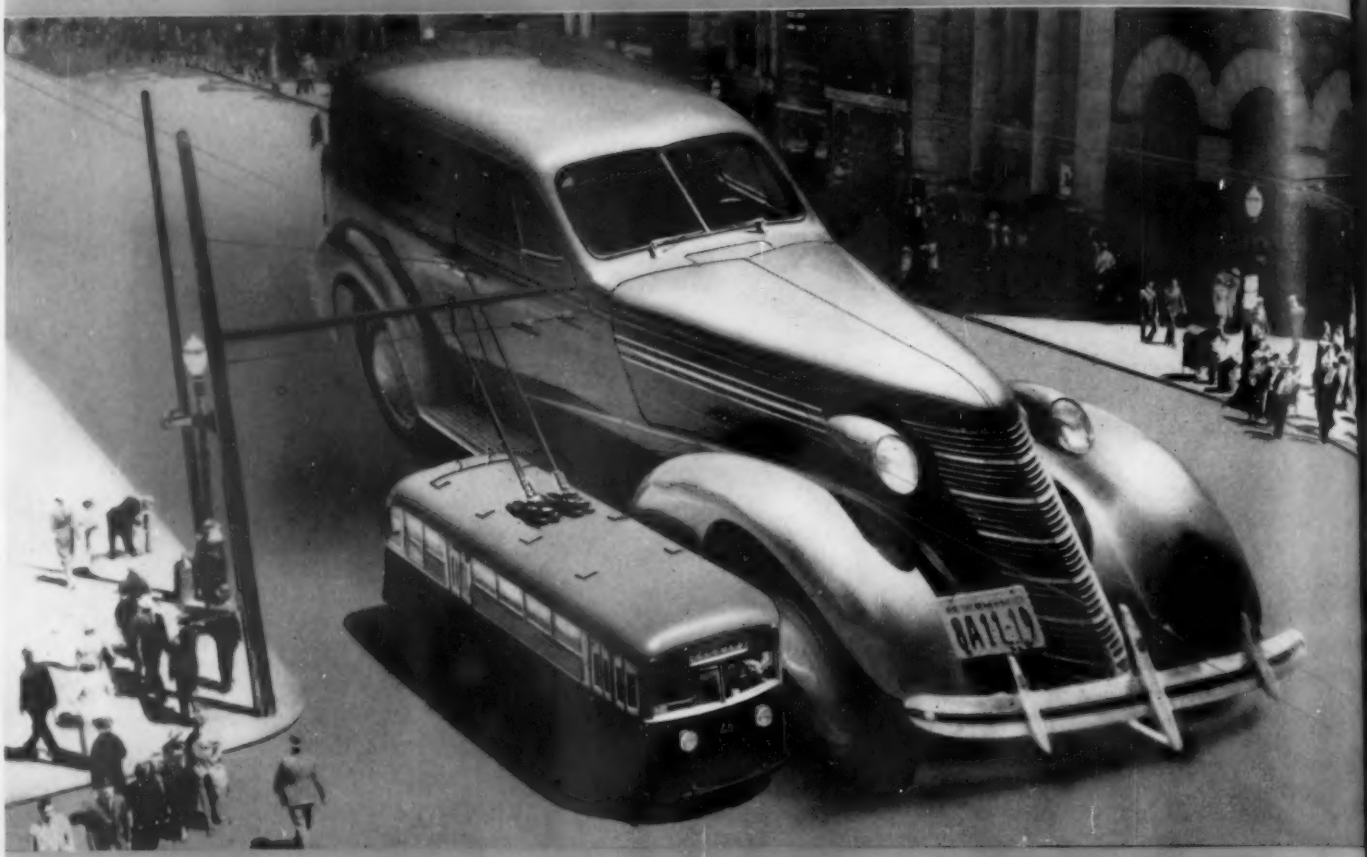
All experts are agreed that the cities could not get along without the fire-alarm box. It would be interesting to note the results of complete box coverage in a number of cities which are now getting along with considerably fewer than a quorum. Lower fire losses might quickly pay the bill of installation—for an adequate system of alarm engenders confidence in both citizens and fire departments.

In the above location the fire-alarm box is a unit topped by a distinctive light for quick discovery at night; at right the box is none too conveniently placed. The two major principles are: provide boxes where needed, and mount them in plain sight

Safety Lighting

NOT FOR YEARS has there been such keen interest in street and highway and flood lighting as is now evident among municipalities. The subject is presented in several practical articles on pages 101, 103, and 105 immediately following the section headed Traffic Control and Facilitation. Included is a description of the modern system opened at Niagara Falls, N. Y.

Automobile Actual Size



1 Trolley Coach Will Seat All the People Who Ordinarily Ride in 24 Automobiles Requiring at Least 10 Times As Much Street Space*

WE ASKED our trick photographer to make a picture showing you an automobile in its true light—considering the number of people it usually carries and the amount of street space it occupies. Even though the result looks monstrous we assure you it's very much on the conservative side.

Now we don't propose to hinder progress. The fact that almost every American family can own an automobile is a fine thing. But when they use automobiles in the limited street space of a city to the extent of seldom or never using the public transit system, thus causing stagnation of traffic, then it is time for traffic engineers to go to the source of the trouble.

The way to reduce traffic congestion is to revitalize the MOST EFFICIENT USER OF STREET SPACE—THE PUBLIC TRANSIT SYSTEM. Any city government can render the citizens a real service by co-operating with the transit company to modernize and *promote increased use of its system.*

People like to ride in modern electric coaches. They carry them swiftly, noiselessly, comfortably, and at low cost. Furthermore, this means of travel pays its own way. We think that when the facts are known they will appeal far more to the people than huge expenditures for street widening, express highways, and municipal parking lots which load them with unfairly proportioned taxes—and never provide more than a partial solution of the problem.

*Based on the national city average of 1.72 passengers per automobile.

REVITALIZE PUBLIC TRANSIT TO REDUCE TRAFFIC CONGESTION

GENERAL ELECTRIC

232-125

Vol. LIV, No. 8 The American City AUGUST, 1939

Dearborn to Have Modern Subdivision

A WELL-PLANNED subdivision project for Dearborn, Mich., combining single-family homes, apartment houses and a large community business center building with ample school, park and playground areas, is announced by the Trustees of the Ford Foundation.

The program for this new Springwells Park Subdivision at Airport Drive and Greenfield Road provides for immediate construction of the business center building, 15 apartments with accommodations for 203 families, and 53 single homes, at a construction cost of approximately $1,525,000. As a second stage in the development, the Foundation is planning for early construction of single homes and apartments to accommodate approximately 334 families.

Contracts for construction of sewers have been let. Removal of trees from proposed streets is in progress. Rough grading in preparation for paving, laying of sidewalks, installation of water and other utilities is almost completed.

The apartment buildings to be constructed at once are of the two-story walk-up type and two-story terrace type. They will conform to the most modern architectural planning, including approved air-conditioning systems and electric garbage disposal units in all apartments. The apartments will vary in size from two to six rooms. Rentals will be in the medium-price range. Garages will be available to those requiring them. Approximately 80 per cent of the land assigned the apartment area will be devoted to gardens, decorative garden walls and walks.

Typical Five-Room House for the Single-Family Section

These apartment buildings, construction contract for which has been awarded to the Byrne Organization, will be of fireproof construction, being framed in Stran-Steel. The sidewalks will be of brick and the floors of reinforced concrete covered with hardwood flooring.

The new single homes will be of five and six rooms and will be built for sale only. All will have garages attached or semi-detached with a breeze-way between the house and the garage. The prices of the homes are expected to start at $5,500.

The business center building, which will face Greenfield Road, will be set back a sufficient distance to provide parking space for more than 100 automobiles. The first unit will have space for nine shops on the first floor, and office space for physicians, dentists and the

APARTMENT HOUSE SECTION OF SPRINGWELLS SUBDIVISION, DEARBORN, MICH.
The 15 apartments will accommodate 203 families in spacious surroundings

First Unit of Community Business Center for Ford Foundation Development

Ford Foundation on the second floor. Ample room will be allowed for future expansion.

Of the total area of the new subdivision 7½ acres is to be devoted to a school plot with adjoining playgrounds. Other play spaces and parks to be provided throughout the subdivision will total approximately 6 acres.

The entire tract has been laid out in accordance with the latest principles of residential community planning, which embodies the extensive use of cul-de-sac residential streets. The absence of express routes, except those on the border of the subdivision, will reduce traffic hazards to a minimum. Provision has been made, however, for conveniently handling the usual flow of residential traffic.

The single building plots will

(Continued on page 70)

Tar Pre-Mix for City Streets

Method Devised and Used Successfully for Five Years in Cranston, R. I.

By ELTON F. DURFEE
Commissioner of Public Works, City of Cranston, R. I.

OWING primarily to a lack of funds for street work in Cranston in 1934, a new type of low-cost pavement was tried out experimentally. The experiment proved so successful that since that date we have constructed the equivalent of about 70 miles of 18-foot roadway with this new type of pre-mix. Up to the present time we have not had to do maintenance work on any of this paving, with the exception of some seal-coating which was done as a further experiment.

The Method of Mixing

The basis of this type of paving is a tar pre-mix which is fundamentally new. Stockpiled screenings smaller than 1-inch from a gravel plant comprise the aggregate. In mixing the material in this stockpile with the tar, one, two or three power shovels are used, depending upon the amount of material and the speed required. A shovel takes material from the pile, makes about a half-turn, and places the material in a conical-shaped pile. When two or three bucketfuls have been dumped to form a cone, tar is sprayed over the pile through a 30-foot length of 1-inch pipe connected by a rubber hose to a distributor truck, while the shovel continues to dump material onto the apex of the pile. At the end of the pipe are three short nipples set in a triangle, into which are screwed three standard spray nozzles taken from a distributor truck. The 1-inch feed pipe rests on a frame with a cross-bar set about 5 feet above the ground. An oar-lock on the cross-bar gives freedom of action for swinging the feed pipe.

The tar is applied like a shower-bath spray over each bucketful of aggregate. As each bucket of aggregate is dropped, the cone grows larger in diameter and the aggregate spreads by its own weight to a thickness of approximately ½-inch. Thus not only have we the effect of the penetration of the bitumen as it is sprayed on the top of the aggregate, but there is also a saturation from the bottom, or inverted penetration, due to the coating of tar on the previous bucketful of aggregate.

To keep a check on the amount of aggregate used, the shovel operator is instructed to bring up a full bucket each time and to keep a count of the number of dipperfuls. We use 18 gallons of Koppers Tarmac for each cubic yard of aggregate. By watching the indicator on the truck, the shovel operator can regulate his speed so that both his operation and the spraying operation are completed at the same time. The set-up for this work requires only a fine bank-run gravel about 50 per cent sand, and a power shovel.

PRE-MIXING GRAVEL AND TARMAC FOR PAVING IN CRANSTON, R. I.
Three shovels are shown in operation with the Tarmac distributor and one truck being loaded. This set-up mixed and loaded 2,781 cubic yards in 49 hours, laying 41,296 square yards of 2½-inch pavement

When both the distributor and the shovel have deposited the required amount of material for one batch, the shovel begins the mixing process. This is done by taking a bucketful of the sprayed material from the front of the pile and placing it at the back. The operation continues until the aggregate is thoroughly mixed, when it is placed in a stockpile. Usually one shovel will mix aggregate and about 3,000 gallons of tar per day. When more than one shovel is used, one usually piles the aggregate for the spraying and the other does the mixing. The length of time required is dependent upon the weather. In warm, dry weather the mixing can be done very quickly, while in cold or wet weather it is slowed up.

We have found as a result of our experience that clean or washed sand does not make as good a pavement as that which carries some silt or other fine material. The mixed material will not harden if left in the stockpile for a long period. We have left some of this in piles and used it almost a year later, finding it in very good condition although slightly crusted on the outside.

Paving with the Mix

For paving with this mix, a street is prepared by bringing it to grade, and then about 6 inches of gravel is placed on the subgrade. This is thoroughly rolled and the pre-mixed material spread either with a spreader box or by hand with rakes to a depth of 2½ to 3 inches loose, and compacted by rolling to about 2 inches compacted thickness. We usually get about 13 to 14 square yards to each cubic yard of mixed material. At the end of each day's work a 10-ton roller is run over the surface just enough to smooth it. The following morning the roller does the finishing work by going over it again to take out any roller marks. It is not necessary to stop traffic at any time during the process of construction. Traffic going over this material puts it into better condition for rolling.

On one of the early jobs using three shovels, the shovels started to mix the day previous, and we mixed and laid 42,670 square yards in 49 working hours. The following table shows the cost of this job.

MIXING AND LOADING

Material	Quantity	Rate	Total	Cost sq. Yd.
Tarmac	49,910 gals.	.1099 per gal.	$5,485.11	
Gravel	2,781 cu. yds.	.30 " yd.	834.30	
Cost of mixing and loading			1,437.50	
Total			$7,756.91	
(Total number square yards mixed—42,670*)				$0.1818
HAULING				
10 trucks, 517 hrs., $2.00 per hr.			$1,034.00	$0.0262
SPREADING AND ROLLING				
10 men, 2 foremen, 1 timekeeper and 1 roller			$429.50	$0.0108
(Total number square yards spread 39,520*)				$0.2188

NUMBER OF GALLONS OF TAR PER SQUARE YARD—1.17

Cost of tar per sq. yd.	$0.1285
" " gravel per sq. yd.	0.0196
" " mixing per sq. yd.	0.0337
" " hauling per sq. yd.	0.0262
" " spreading per sq. yd.	0.0108
	$0.2188

*The discrepancy in these figures is due to 4,150 yards of mixed material being hauled out by the same trucks to other work going on at the same time.

The steam shovels were owned by the city and are figured at a rate of $50 per day, and the city trucks at $2 per hour, and while relief labor was used, an adjustment was made in the rate per hour to conform with the price paid for regular labor. Three shovels were used on this work; one piling the aggregate for spraying, one mixing, and one loading trucks or piling material in a stockpile.

Advantages of Tar Pre-Mix

We have been able to use a tar with a viscosity as high as 84 at 50 degrees C in this pre-mix, instead of around 50 as used in mixed-in-place work. We expect by further experimenting to raise the viscosity higher, to produce a more dense pavement. The higher-viscosity tar is also quicker-setting, and it is expected that the durability of the pavement will be increased accordingly because by using a higher viscosity a much higher percentage of refined tar is obtained.

In this method the aggregate is thoroughly mixed, and no particle of sand can be found in a completed batch that has not been entirely coated with tar. The small stones are embedded in this mastic, so that there is no chance of their pulling out. Further, there is no chance for either fat spots or lean mixtures, as the entire 1,000 gallons is thoroughly mixed before being placed in the stockpile. Mixing can proceed in any weather. We have successfully mixed with the thermometer at 10 degrees above zero, and also in a light rain. The sand does not have to be heated or kept dry.

This pre-mix material can be laid to any line and grade the same as sheet asphalt, and work can progress without stopping traffic. In fact, the more traffic that goes over the pavement between the time it is laid and finally set, the better the pavement. In several instances we have used city trucks to run back and forth over the pavement to help compact it.

The finished pavement is practically skid-proof. Tests made on these pavements while wet showed no skidding. Further, the mixed material makes an excellent patch and can be used under water if necessary. Because of the large amount of work we have had to do with this material in the past five years, we have not done as much experimenting as we wished. We have found many other uses for the material other than paving.

We figure this method of cold mixing is much better than other types of cold mix, because it is cheaper to pre-mix the material at the bank by this method and haul it to the street where it is spread and raked, than it is to haul the aggregates to the job, spread them to grade and spray with a mixture of bituminous material in place. The cost of loading, spreading and rolling is about the same for either type of construction with the advantage in favor of the pre-mix method, which insures that all material is thoroughly mixed. Also, the depth of the finished pavement can be better controlled.

Know the Trolley Coach

And Its Relation to Transit Modernization

IN a number of cities transit companies would like to inaugurate trolley-coach operation or add to their trolley-coach fleet. A number of cities would like to see trolley coaches installed. They are not necessarily the same cities.

The fact of the matter is that the trolley coach is recognized as a symbol of responsible urban-transportation operation by independent private companies. Harry C. Koch, of the city of Detroit, showed in his article in the March, 1939, issue of THE AMERICAN CITY that, in cities of 1,000,000 population or more, municipal government must sooner or later accept ownership of these railway facilities and then lease them at a deficit to the general city-transit system or assume their operation. The transit companies in the great cities agree that this is the only solution. It has already taken place in New York City, the greatest passenger market in the country.

BEATEN ON POINTS

L.C.C. TRAM. "Hard lines on me!"
MOTOR-BUS. "Yes, it's always hard lines with you, my boy. That's what's the matter; you can't side-step."

Punch *July, 1914*

A transit system comprising subways, street cars and buses is naturally much more complicated than a bus company. Electric transportation implies technical problems in addition to those of smooth operation and making financial ends meet. A bus company, on the other hand, is right in everybody's alley. All you need is a franchise, enough buses and competent drivers to carry the passengers! There ought not to be any invisible costs or any long-standing debts of honor, and there are no embarrassing stakes in the city streets.

Fixed Investment

The street car was a restraining influence of a very high order. No matter to what stock-jobbing excesses previous generations of promoters went, the tracks and wires and power supply and the non-transferable rolling stock remained, and were the only alibi for the reams of certificates. Somebody besides the city government always held the bag. There were always the traction interests or the power trust to blame for the deteriorating service.

The buccaneers have passed. In the place of promoters and milkers, there is a generation of hard-working, not too happy, managers, the tracks, the wires, some of the original vehicles, and the consequences of their grandfathers. These men know how to operate a transit system adequate for the requirements of their communities; but, like a man with a $2,000 income and a $50,000 debt, they have never been in a position to use their knowledge and skill.

The question now before the larger municipalities of the country is: (1) Shall these experts of a city-wide transportation system be starved or otherwise compelled to scrap all their transit property excepting only buses, or (2) shall they be superseded by men thinking only in terms of bus transportation, or (3) shall the city cooperate with the present managers in the rehabilitation or re-creation of a modern city-wide centralized transit system?

It is a tough question, with different answers in different cities. The different answers, however, are due largely to the existence of different men in the different cities. For it is agreed that a central system is the only kind which will work permanently. If ten separate bus lines should take the place of an existing monopoly, sooner or later the separate lines would have to be "unified."

So a prior question is: "Is our present transit management modern-minded and conscientious?" In most cases the answer will be that it is. In all such cases, therefore, it is to the advantage of the city to encourage rehabilitation. The first step is to inculcate confidence in the mind of the local operator. Only a confident man or organization can plan constructively for the future. With the city against him, he sits tight, which is slow suicide.

Service Counts

The trolley coach is a fighting vehicle, not a natural evolution, as is the gasoline bus. It was developed (1) to prevent electric street transportation other than rapid transit from perishing from the earth; (2) because the automotive

and the rubber-tire industries had shown that electric traction was not indissolubly wedded to steel tracks; (3) because the inherent advantages in superior pulling power, smoothness and low maintenance expense demanded the use of electric traction wherever reasonable costs or density of population (paying revenue) permitted. Low maintenance cost is of as great importance to the passenger (municipal government and civic and business interests) as to the transit company; for the quality of service is not to be measured by that given by new vehicles, but by the average quality during the life of the vehicles. Low maintenance costs indicate slow wear and a longer retention of original riding quality.

The manufacturers of trolley coaches in meeting gasoline-bus competition must necessarily take into account the long term. The lower first cost of the gas bus furnishes sufficient temptation to buy it. Added to this lower price is the absence of any line costs. What, then, is the urge which has brought trolley-coach operation to more than 40 cities?

Let the answer come from Shreveport, La., an all-trolley-coach city. Says *The Shreveport Times*:

"In granting a temporary franchise to the Shreveport Railways Company to operate trackless trolleys to Cedar Grove via St. Vincent's Avenue, the City Council yesterday doomed the last of the street cars in Shreveport.

"We do not think it amiss to say that when the new Cedar Grove service is launched, Shreveport will have a street transit system second to none in the world in quality.

"In speed, comfort, silence, absence of fumes, ease of traffic handling and every other important element of transportation quality, the trackless trolleys are unquestionably supreme. They are to the old street cars what the flashing automobile of today is to the first two-cylinder carriage of pioneer motoring days.

"It might be well to begin planning now for a gala city-wide celebration to be held on the day the last street car makes its last noisy voyage to Cedar Grove. There should be notables and a band aboard, with banners streaming from the prow of the ancient vehicle."

Trolley coaches are indeed operating in 44 cities. But examine the accompanying tabulation of operations in these cities where hundreds of street cars and buses are operating. Knoxville, Tenn., Rockford, Ill., Topeka, Kans., have *four* trolley coaches each; Fitchburg, Mass., has *seven* trolley coaches; Wilkes-Barre, Pa., *three* trolley coaches. Brooklyn is one of these cities; Brooklyn, home town of the Trolley Dodgers, where right now there are 1,275 street cars, including 100 P.C.Cs., 309 gasoline buses—and *eight* trolley coaches. In view of the fact that in Brooklyn there is a customer density to make trackless trolley operation profitable and the B.M.T. has the necessary power facilities to make such operation feasible, one would expect to find a larger number of trolley coaches in operation there. The B.M.T. management has indicated a willingness to extend the operation of these vehicles on its properties under its existing franchises, practically all of which are perpetual. The city government has adhered to the policy that there could be no extensive replacement of street cars by trolley coaches unless there was a simultaneous replacement of perpetual franchises by ten- or fifteen-year permits with all the precarious conditions incidental to such short-term grants. Sound as the policy of short-term franchises is where untried and untrustworthy operators may be concerned, it is not surprising that an established business involving many millions of dollars of property investment and 10,000 employees hesitates to accept one in exchange for perpetuity. In the event of unification, the franchise difficulties would disappear, the authorities would be in a position to operate any type of vehicle where it belonged, on the sole basis of its riding, carrying and economic qualities. Will the future witness the gradual, or sudden, substitution of gasoline buses for street cars in Brooklyn, or will an impartial municipal study be made of modern electric versus automotive operation, and vice versa, in the interests of the riding public and permanently successful urban transportation?

MODERN TROLLEY COACHES IN 38 CITIES

City	Population	Number of Trolley Coaches 40-Pass. 2-Motor	40-Pass. 1-Motor	30-35 Pass. 1-Motor
Atlanta, Ga.	347,991	0	29	0
Baltimore, Md.	801,741	15	36	0
Boston, Mass. (Greater Boston)	1,317,710	37	55	0
Brooklyn, N. Y.	6,930,446	8	0	0
Chicago, Ill.	3,376,438	135	17	0
Cincinnati, Ohio	451,160	6	22	0
Cleveland, Ohio	900,429	28	0	0
Columbus, Ohio	290,564	18	40	20
Covington, and Newport, Ky.	94,996	0	31	0
Des Moines, Iowa	142,469	0	31	0
Dayton, Ohio	200,982	61	0	0
Duluth, Minn.	101,463	18	11	0
*Fitchburg, Mass.	40,692	7	0	0
*Flint, Mich.	156,492	46	0	0
*Greensboro, N. C.	54,569	0	0	12
*Greenville, S. C.	29,154	0	0	13
Honolulu, T. H.	137,582	0	30	0
Indianapolis, Ind.	364,161	152	0	0
Kansas City, Mo. and Kans.	515,088	0	34	0
*Kenosha, Wis.	50,262	22	0	0
Knoxville, Tenn.	106,802	4	0	0
Louisville, Ky.	307,808	0	32	0
Memphis, Tenn.	253,143	14	0	0
Milwaukee, Wis.	578,249	0	114	0
New Orleans, La.	458,752	13	0	0
Philadelphia, Pa.	1,950,961	0	0	8
Portland, Ore.	301,815	0	140	0
Providence and Pawtucket, R. I.	330,184	87	0	0
Peoria, Ill.	104,967	5	2	0
Rockford, Ill.	85,864	4	0	0
San Francisco, Calif.	634,394	9	9	0
Salt Lake City, Utah	140,267	26	0	0
*Shreveport, La.	76,655	0	55	20
St. Joseph, Mo.	80,935	0	8	27
Toledo, Ohio	290,718	18	0	0
Topeka, Kans.	64,120	0	0	4
Youngstown, Ohio	170,002	0	34	0
Wilmington, Del.	106,597	0	55	0
		733	785	106
* Cities where no street cars are operated. New Jersey Cities, Public Service Coordinated Transport		583	0	0

Now's the Time

To what extent are city governments to blame for the light operation of trolley coaches? Where they are to blame, it is for these reasons: (1) lack of knowledge of the advantages of the trolley coach as

Two Trolley Coaches Passing on Hairpin Turn on 8 Per Cent Grade Up and Down Market Street and Clayton Street, San Francisco

a vehicle that is comfortable and represents permanent urban transportation; (2) distrust of the existing transit management; (3) traditional and political opposition to the "traction interests"; (4) prejudice in favor of buses based on an unthought-out belief that modern city transportation is attained only by abandoning worn-out trolleys and installing new gasoline buses; (5) apathetic transit management, timid, fearful, or incapable of making a radical decision and selling it to the municipal government, the local civic and business interests, and the general public; (6) a combination of the foregoing, which adds up to the first cause—lack of information.

Where is this information to be had? Through mutual confidence and respect between the local transit company and the city government and local business interests. If this does not exist and cannot be attained, the fault is due to the men involved, either company or government or both. In this age it is safe to guess that the president of any transit system would like to see his company more prosperous. In most instances, the municipal government desires merely good transit service.

One of the reasons why modernization occurs so slowly in most cities is that nothing is seen between electric cars and gasoline buses. An electric-railway president is naturally reluctant to leap from his own business into another type of business, or to build up his own system in the shadow of a threat to destroy him. The common result is that eventually conditions become so unsatisfactory that the operator throws up his hands, and one more city goes all-bus, giving the impression that the modern method has at last been acknowledged, and adding to the impression that buses are the only city mass-transportation vehicles of the future.

Enduring progress is gained a step at a time, not by leaps and rebounds. Wherever applicable, city governments would do well to encourage and urge the company to extend trolley-coach operation throughout the city. Only in such extensive operation can the intrinsic advantages and disadvantages of modern electric operation be accurately measured.

Cities have everything to gain in backing their transit companies in the widespread and confident installation of trolley coaches. The future is a long, long while.

Trends in Number of Retail Stores

THE Board of Public Land Commissioners of Milwaukee, Wis., of which Charles B. Bennett is City Planner, has issued a tabulation of the trends in the number of retail establishments per 100,000 population in the city of Milwaukee. From this list, which covers the years 1900, 1910, 1920, 1930, and 1938, the following figures have been taken:

During this period the population of Milwaukee increased from 285,315 in 1900 to 457,147 in 1920 and to an estimated population of 625,000 in the year 1938.

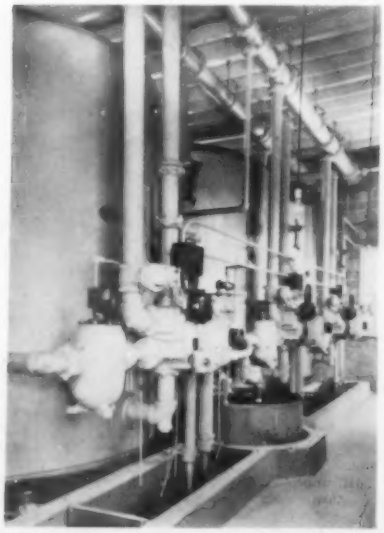
Type of Business	Number Establishments per 100,000 Population		
	1900	1920	1938
Bakeries	93.93	63.22	61.76
Barber Shops	78.51	77.22	112.32
Beauty Shops	....	13.34	82.72
Cleaners and Dyers	6.66	10.50	35.04
Clothiers	25.59	29.75	17.60
Coal Dealers	29.79	29.31	50.24
Confectioners	103.74	55.78	35.52
Drug Stores	48.72	54.25	56.64
Filling Stations	....	8.97	120.16
Florists	16.12	15.09	25.60
Fruit Dealers	4.21	6.12	12.00
Furniture Dealers	12.97	13.34	20.80
Grocery Stores	276.19	294.43	236.32
Hardware Dealers	24.53	20.78	18.88
Jewelry Stores	25.94	26.91	29.12
Laundries	18.93	15.09	22.40
Meat Markets	127.23	119.44	136.80
Millinery Stores	26.99	23.41	14.40
Restaurants	15.77	45.50	88.16
Shoe Repair Shops	....	67.59	62.24
Shoe Stores	110.05	40.91	30.40
Tailors	118.12	88.37	51.20

Water Softening at Hollywood, Florida

Zeolite Units Regenerated with Sea Water and New Cast Iron Line Tested for Integrity of Coating

By WILLIAM SYDOW
Consulting Engineer,
Miami, Florida

THE use of sea water for regenerating zeolite water softeners in place of brine made from purchased salt, and the use of an old 6-inch pipe line for delivering the sea water, is effecting an annual saving of nearly $7,000 in the operation of the enlarged Hollywood, Fla., municipal water-softening plant. Hollywood-on-the-Atlantic is about 20 miles north of Miami. It was founded in 1922; its buildings are modern and its attractive location makes it the home of 7,000 residents, increasing to 15,000 in winter.



The Plant Before Changing to the Use of Sea Water for Regeneration

The municipal water supply is secured from a group of 70-foot gravel-wall wells drilled about 4½ miles from the ocean and pumped with individual Layne-Bowler turbine well pumps. The water has a hardness of 17 grains, or 281 ppm, and was first treated about ten years ago, by using a coke aerator to remove the hydrogen sulphide and to reduce the iron and carbon dioxide content. In 1936 the first softening units were added. Permutit zeolite treatment was adopted, since it appeared to have a number of advantages over the usual lime treatment under the local conditions.

Zeolite mineral has the property of softening hard water as it percolates through it. During contact, the calcium and magnesium compounds leave the water and combine with the zeolite, being replaced with sodium from the zeolite. These reactions result in a zero-hardness water which is then brought up in Hollywood to 5-grain hardness, 86 ppm, through the admixing of about 30 per cent of untreated water before delivery to the mains.

The quantity of water which can be softened by a given amount of zeolite is limited by the amount of the sodium contained in the mineral. Therefore the property of softening water disappears after the requisite quantity of water has passed through. The zeolite is then regenerated and the original softening property regained by passing a solution of salt through the zeolite. This may be a brine made with purchased salt, or a natural brine such as the ocean. In the chemical reaction which takes place, the sodium in the salt solution combines with the zeolite, and the calcium and magnesium leaves the zeolite and joins the salt solution being wasted. After the regeneration is completed, the bed is thoroughly rinsed with fresh water, which is run to waste, and the unit is again placed in service for the softening cycle.

The Hollywood zeolite softeners were originally installed to operate on common salt; ocean water could not be used at first, because the money for laying the necessary pipe

line was not available. In 1938, however, the rapid increase in demand for water required the enlargement of the treatment and pumping plant and also made necessary extensions and other improvements in the distribution system. In the work of re-designing the distribution system, it was found that a 6-inch fresh water line existing between the ocean and the pumping plant could be used to advantage for delivering sea water to the softeners for regeneration. The line was disconnected from house services and from the rest of the distribution system, and some gaps were filled in with new pipe. New 16- and 12-inch pipe was laid parallel to the 6-inch line from the pumping plant to the beach and connected into the existing distribution system at street intersections. It was also connected into the 100,000-gallon tank located midway between the plant and the beach, and into the 200,000-gallon tank at the beach.

The completion of the work has included increasing the softening capacity with an added 500,000-gallon Permutit installation to furnish a total of 2,000,000 gallons of 5-grain water per day; the changing-over of the plant to regenerate on sea water; the addition of a 200,000-gallon Chicago Bridge & Iron Co. elevated tank to augment the existing 100,000-gallon elevated tank, and the construction of a 1,000,000-gallon steel surface storage tank by the same company. The elevated tanks are located about two miles apart with a difference of about fifteen feet in the elevation of the overflows. The lower tank is equipped with an altitude valve to prevent overflow and thus to permit the higher tank to be filled. Additional Gardner-Denver and Pennsylvania pumps were installed at the plant, and automatic operation of softeners and pumps is provided. A 200-gpm American centrifugal pumps was installed to handle the sea water for regeneration.

Precautions Against Pipe Corrosion

One of the uncommon problems of the project was the prevention of corrosion of cast iron pipe due to the acid soil found in a section of the city built on filled ground which had previously been occupied by the marsh. New lines laid in this section were furnished by the U. S. Pipe & Foundry Co., coated with a coal-tar product and tested at the mill to insure a coating free from pinholes. During shipment and handling in transit, some abrasion resulted in breaking down the coatings, and the abraded places were touched up at the site of the work.

Electrical tests were made at the trench-side with a homemade device consisting of a piece of copper wire screen about 1 foot square fastened to the end of a wooden handle. High voltage was impressed on the screen with an automobile coil energized from a storage battery. One wire from the coil was placed in contact with the inside of a length of pipe, and the operator slowly swept the outside or coated side of the pipe with the screen. Openings in the coating, many of which were too small to be seen, were detected by the flashing-through of the high-voltage current. Such openings were immediately painted with the coal-tar product and re-tested.

The New 200,000-Gallon Tank on a 107-Foot Tower at Hollywood, Fla.

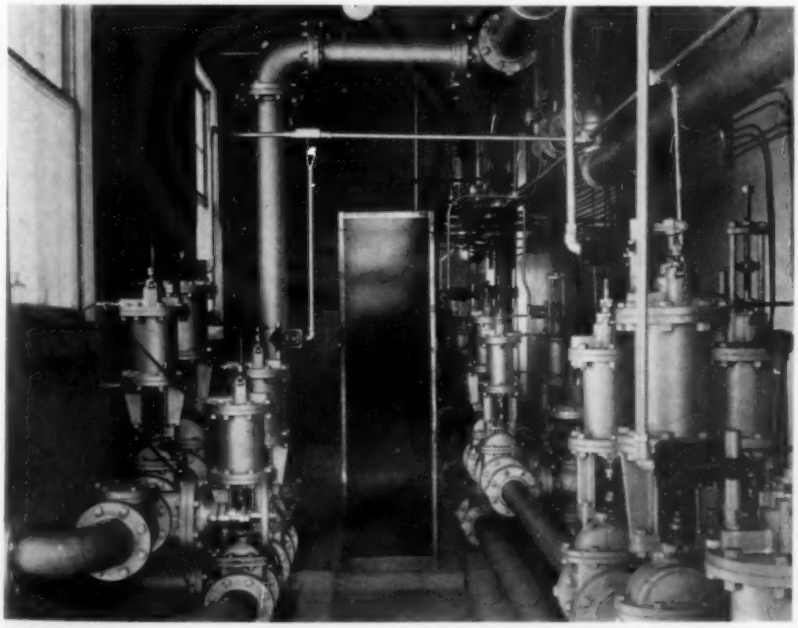
The pipe was then carefully lowered into the trench with slings hooked into the ends. After the cement joints were completed and leakage tests made, they were swabbed over with the protective material.

Advantages of New System

The entire project was completed and placed in operation in December, 1938. Pressure and flow conditions improved immediately. Recording pressure charts taken near the center of the distribution system before the improvements were completed had showed a variation during a 24-hour period from 64 down to 30 pounds. Now the pressure charts show a nearly perfect circle, with the pressure varying only from 58 to 62 pounds.

One of the most pleasing results of the improvement has been the

(Continued on page 70)



The Hollywood Water-Softening Plant After Changing to Sea-Water Regeneration

Zoning Group Housing Projects

By PAUL OPPERMANN
Assistant Director, American
Society of Planning Officials

WITH the Federal Housing Administration active in every part of the country; with approximately 250 local housing authorities in more than 35 states cooperating with the United States Housing Authority to provide low-cost housing for the lowest third of American family incomes, the large-scale project is demanding and obtaining serious study.

The so-called garden-type apartment* enjoys greater flexibility than public housing projects, as to location, floor-plan, and exterior design, because it is privately owned and operated, and principally because it may be accommodated to a greater range of family income.

In many cases cities have revised their zoning ordinances, placing portions of areas previously zoned industrial or commercial in multiple-residence classifications to permit developing them with these desirable projects.

Multi-Family Projects in Single-Family Zones

Greater difficulty and more vocal opposition have been encountered where the project has sought to enter single-family residence zones. Owners and occupants of single-family dwellings have felt that the admixture of houses and apartments, even when the latter represent high standards of site planning, building construction and design, will depreciate the value and desirability of their properties.

We have not yet had sufficient experience with the new and better types of group housing to determine their effects upon adjacent property.

Apparently, the problem is one of growing importance, as the Federal agencies engaged in urban housing are constantly being confronted with it, and the New Jersey Federation of Official Planning Boards, the New York State Federation of Official Planning Boards, and many other planning bodies have accorded it a prominent place on their agenda. Frequent inquiries are received by the American Society of Planning Officials on this subject. The methods of dealing with the problem, some of which are described herewith, have been varied.

Orange, N. J., amended its zoning ordinance, changing areas partly in business and partly in single-family classifications to apartment property. In Montclair, N. J., the board of adjustment has approved an extension of privileges permitted in the apartment zone to a project involving six buildings housing six families each proposed for a single-family district. A site proposed for a garden-type apartment in West Orange, lying in a single-family zone adjoining a two-family zone, was to have been placed in the latter classification under an amendment of the ordinance, but residents of the one-family zone objected and the amendment was not adopted. Adjustments in the site plan of the project are being made, however, which may be found to meet these objections.

Some communities have taken the view that it is undesirable to permit group housing projects in single-family zones, and also that where areas are specifically designated for such uses they should be limited in extent, in most cases located in the transitional areas where central or local business or apartment zones lead into single-family sections. The best procedure, it is claimed, is to consider each proposed project on its merits, upon submission of site plans and architectural plans, either to the Board of Adjustment or the City Plan Commission itself; special rules and criteria working toward permanent standards should be established as experience and knowledge of the different factors and conditions accumulate. Because many zoning ordinances already provide much more multiple-family area than is justified on a basis of land utilization and population trends, additions should be made with extreme caution, if at all.

Garden-Type Apartment Zones Created

The town of Eastchester, N. Y., recently amended its zoning ordinance to provide for "garden-type multi-family dwellings on lots 1,500 or more square feet per family, containing not less than 25 acres of land under single ownership." A new zoning district has been created from an area formerly designated for single-family use. A maximum of 40 per cent lot occupancy is permitted. Buildings may be 3½ stories or 45 feet in height.

The permitted population density of approximately 29 families per acre is somewhat higher than the average of developments of this kind, and the stipulation that developments of less than 25 acres are not permitted is an arbitrary one. Well-designed and successful multiple-family projects have been constructed on considerably smaller properties.

The Tenafly, N. J., zoning ordinance provides a "garden-type apartment" zone. The ordinance has in addition two "group-house" zones. A minimum lot coverage of 25 per cent is specified, and the maximum height of buildings permitted is 2½ stories or 35 feet. Automobile parking area must be provided on the lot at a rate of one space per family. Such space may be included with other required open space.

Tenafly requires that plans for all group dwellings, garden-type apartments, etc., must be approved

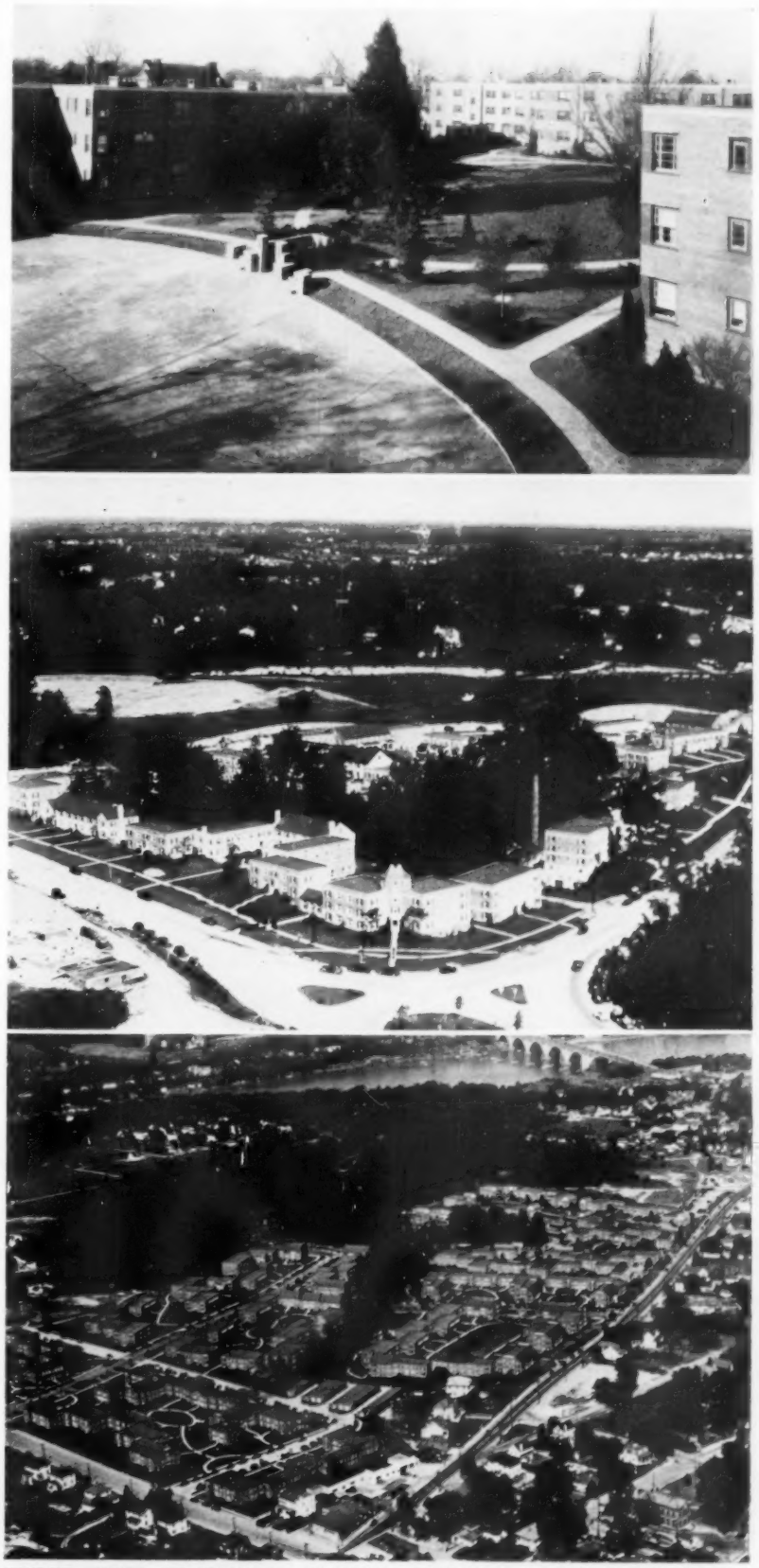
* Defined by the Federal Housing Administration in the April, 1939, issue of *Insured Mortgage Portfolio* as "two- to three-story apartments having a land coverage of not more than 25 per cent and a family density of not more than 20 per acre."

by the Planning Board before a building permit will be issued. This community also provides that the Board of Adjustment, in the case of projects not less than 15 acres in area fronting on permanent public open spaces or having a continuous street frontage of 400 feet, may after public notice and hearing, and upon approval of the Planning Board, waive all yard restrictions provided equivalent open space is supplied and maximum coverage is not exceeded.

The provision that multiple-family zones should provide parking or garage space on the premises is being written into ordinances in many parts of the country. Los Angeles was perhaps the pioneer, having had this regulation in effect four or five years. Arlington County, Va., Bronxville, N. Y., and Greenwich, Conn., in addition to Eastchester, Tenafly and other New York suburbs, now have the requirement. Arlington County was one of the first communities to provide a "group housing" zoning district.

Conversion of Old Dwellings

Spokane, Wash., has devised a method of meeting the demand for conversion of large old single-family dwellings to multiple-family use which may prove of value in the search for regulation of the garden-type apartment. An amendment to the zoning ordinance requires that the applicant for a change in zoning classification shall file with the Plan Commission architectural plans "showing in detail the interior and exterior design of the new or remodeled structure proposed to be built," along with a "description of any proposed landscaping improvements or car-parking area to be included." If a change in classification is authorized, it is made contingent upon site planning and architectural design considerations which "maintain fully or advance the standards of the neighborhood structure," and that the proposed use is in congruity with, or of service to, the neighborhood area. An advantage of this method is that the municipality is enabled to supervise and thereby raise the standards of design of structures and their sites in such a way as to promote civic amenity.



THREE TYPES OF HOUSING PROJECTS BUILT BY PRIVATE ENTERPRISE WITH FHA INSURED MORTGAGES

Narberth, Pa. *Silver Springs, Md.* *Arlington, Va.*

Repairing Truck Breakdowns Before They Occur

Program of Inspection and Lubrication of Trucks Adds Life and Reduces Accidents and Lost Time

LOOKING after the fleet of 182 refuse-collection trucks used by the Refuse Collection Division of the city of Los Angeles, Calif., calls for precision methods. A system has been developed which has reduced collection costs 36 per cent in the required man-hours per cubic yard of composite refuse, half-and-half rubbish and garbage, since 1933. Paralleling this reduction has been the improved care of trucks, or preventive maintenance, which repairs breakdowns before they occur.

The method employed involves the charting of all trucks for servicing and inspection in such a manner that each truck will be brought under the eyes of trained mechanics approximately every 500 miles of travel, and different items checked at 500, 1,000, 2,000 and 6,000 miles. This is in addition to the daily report of the driver, who is required to indicate at the end of each shift whether his truck seems in perfect condition, or what seems to be the matter with it. If at any time a truck is reported by a driver or mechanic to be unfit for service, a red tag, Form 736, reading "HOLD —Bad Order," is wired to the steering wheel, and no one is allowed to remove the truck from the yard while it is so ticketed. The tag is removed as soon as the truck has gone through a complete examination and the repairs have been made.

The Monthly Maintenance Schedule

As an example of the thoroughness with which the planning is carried out to insure care of all trucks, we are reproducing the Monthly Motor Vehicle Maintenance Schedule for the refuse collection fleet for the typical month of May, 1938. At the bottom will be seen the numbers of the various trucks in each group. Group 2 consists of 15 trucks, as follows: 201, 245, 607, 202, 203, 610, 611, 311, 612, 624, 252, 253, 205, 244 and 206. That particular group comes up for servicing on the 2d and the 26th of the month in question. It would be different in other months.

Now examine the upper part of the same chart and note opposite "Service" a series of letters, B, BC, BCD, and BCDE. These indicate the service which the truck is to receive, and the small letters under the various dates, as well as the truck numbers themselves, indicate what groups or individual trucks are to receive the services indicated. It is further noted that the same service is not shown for the same trucks on the 26th of the month as for the 2d. This is because some of the trucks will be receiving the 500-mile service only, while others will be listed for the 6,000-mile service.

MONTHLY MOTOR VEHICLE MAINTENANCE SCHEDULE

SCHEDULE NO. 44 — REFUSE COLLECTION FLEET — MONTH MAY 1938

SERVICE TRUCK GROUPS AS INDICATED

DATE		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
GROUP			6	7	8	9	10			11	1	2	3	4			5	6	7	8	9			10	11	1	2	3				4
SERVICE	B	Sunday	cd	ab	ab	cd	ab	Saturday	Sunday	ab	ab	ab	cd	ab	Saturday	Sunday	ab	ab	cd	cd	ab	Saturday	Sunday	cd	cd	cd	cd	ab	Saturday	Sunday	Holiday	cd
	BC		a	d	c	a	d			d	c	d	b	c			d	d	b	a	d			b	b	a	b	c				a
	BCD		273 274	284 285	288 235	605 290	296 608			623 625	626 214	252 253	254 207	267 266			271	225 275	280 227	286 287	616 313			243 238	614 615	209 318	607 202	629 212				262 269
	BCDE		272 647	649 229	236	603 240	295 294			622	210 321	612 624	246 627	268 632			640 641	224 223	279 278	233 232	609 241			217 218	314	317 251	245 201	211 209				241 260

TRUCK GROUPS

GROUPS			TRUCK NUMBERS				GROUPS			TRUCK NUMBERS				GROUPS			TRUCK NUMBERS				GROUPS			TRUCK NUMBERS			
1	ab	a	606	630		216	4	ab	a	257	258	259	213	7	ab	a	278	279	280	227	10	ab	a	243	238	217	218
		b	317	204	318	251			b	260	261	262	269			b	281	282	228	283			b	291	292	293	
	cd	c	319	250	320	310		cd	c	263	264	265			cd	c	229	649	284	285		cd	c	294	295	296	608
		d	321	210	626	214			d	266	267	268	632			d	650	651	648	230			d	297	298	299	300
2	ab	a	201	245	607	202	5	ab	a	633	635	215	636	8	ab	a	600	601	602	231	11	ab	a		314	614	615
		b	203	610	611	311			b	637	26/25	638	639			b	232	233	286	287			b	617	618	619	620
	cd	c	612	624	252	253		cd	c	640		641	271		cd	c	604	234	645	26/146		cd	c		622	623	625
		d	205		244	206			d	270	219	642	220			d	235	288		236			d	631	613	315	316
3	ab	a	627	246	254	207	6	ab	a	221	644	646	222	9	ab	a	181	237	289	239	12	ab	a				
		b	255	247	248	256			b	647	272	273	274			b	240	603	605	290			b				
	cd	c	628		208	312		cd	c	223	224	225	275		cd	c	241	609	616	313		cd	c				
		d	209	629	211	212			d	276	277	249				d	621	643	634	242			d				

With this in mind, let us take up the various services which are given the trucks, which are referred to under the various capital letters.

The Engine Tune-Up

In an average period of 90 days every one of the trucks is given the engine tune-up service in rotation. This checking-up on the condition of the engine quickly tells the story of the efficiency of the engine itself and of the carburetor, whether it is wasting gasoline and whether compression is low in the cylinders. For this check, the Weidenhoff Motor Certified Tune-Up System and an exhaust gas analyzer are used. The analysis charts are bought in quantity from United Motors Corporation, Form 270, and the machine which performs the various checks is employed. The first test that is made is compression, No. 4 on the report blank, the cylinder being tested first dry, and then with oil if loss in compression is shown. If the compression rises when tested with oil, the loss is due to poor piston rings. If there is still some loss, the valves are to blame.

A check mark on the inspection blank indicates that the test has been met and is "OK." When the inspection is complete, all troubles with the motor that do not involve taking down the motor or general shop repairs will have been corrected. The various parts checked include also the batteries, starter, spark plugs, general ignition, distributor, coil, condenser, ignition cable, vacuum, ignition timing, valve timing, carburetor, fuel pump, generator, radio, horn, lights, windshield wiper, oil filter, and cooling system. Rather a thorough going over of the mechanism.

WEIDENHOFF

MOTOR **CERTIFIED** TUNE-UP

ANALYSIS

BY

UNITED MOTORS SERVICE

Name of Owner ..... Telephone Number ..... Date .....

Street Address ..... City .....

Make of Car ..... Year and Model ..... License No. ..... Speedometer Reading .....

1. Battery: Floor boards must be removed before testing.

Specific Gravity: 1 ..... 2 ..... 3 ..... (Should be 1250)

Battery Cables: O.K. ..... Replace ..... Terminals: O.K. ..... Corroded .....

Clamps: O.K. ..... Defective .....

Open Voltage Test: 1 ..... 2 ..... 3 ..... (Should read 2 volts or more)

Starter Load Voltage: 1 ..... 2 ..... 3 ..... (Should read 1.5 volts or more and all cells should read the same)

Is battery of sufficient capacity for car and extra accessories: Yes ..... No .....

2. Starter:

Amperage Draw (cranking speed) ..... should be .....

Voltage Test (cranking speed) ..... (should be 4½ to 5½ volts)

Brushes ..... Brush Spring Tension ..... Commutator ..... Cable .....

Starting Switch ..... (For Starter see Test No. 17)

3. Spark Plugs:

Operating Test — Right block 1 2 3 4 5 6 7 8 / Left block 1 2 3 4 5 6 7 8

O. K. ..... Clean and Re-Gap ..... Replace .....

Is plug correct plug for car and proper heat range? .....

4. Compression:

Right Block — Pounds per Cyl.: 1 2 3 4 5 6 7 8 / Valve Condition: / Ring Condition:

Left Block — Pounds per Cyl.: 1 2 3 4 5 6 7 8 / Valve Condition: / Ring Condition:

Head Gasket: O. K. ..... Check ..... Cyl. Head Bolts: O. K. ..... Tighten .....

5. General Ignition Test:

Voltage at Coil (battery side—points closed): ..... (Should be 6 volts)

Spark Length at Idling ..... should be ..... (1.5 M.M less than factory specifications for coil at 600 R. P. M.)

Amperage at Distributor ..... (Should be 1½ amperes or over)

6. Distributor:

Distributor Cap: O. K. ..... Replace ..... Rotor: O. K. ..... Replace .....

Breaker Points: O. K. ..... Replace ..... Spacing ..... Spring Tension .....

Voltage Reading across Points (With points closed): ..... (Should be zero)

General Conditions: Cam ..... Shaft ..... Bearing ..... Wiring and Washers .....

Synchronism: O. K. ..... Reset .....

7. Coil:

Spark Length — High Speed ..... Should be ..... / Low Speed ..... Should be .....

8. Condenser:

O. K. ..... Replace .....

9. Ignition Cable:

Visual Inspection: Worn ..... Cracked ..... Oil Soaked ..... Terminals .....

Insulation Test: O. K. ..... Replace .....

FORM NO. 270 PRINTED IN U.S.A.

10. Vacuum Test:

Sticking valves ..... Burned valves ..... Valve guides .....

Valve springs ..... Carburetor idle adj. ..... Muffler .....

11. Ignition Timing:

O.K. ..... Reset .....

12. Valve Timing:

Tappet clearance: O.K. ..... Adjust ..... Valve timing: O.K. ..... Reset .....

Chain stretch or poor setting .....

13. Carburetor:

O. K. ..... Adjust ..... Remove and Repair .....

14. Fuel Pump:

Gasoline flow ..... Pressure .....

Gasoline line suction ..... Connections: O.K. ..... Tighten .....

15. Vacuum Tank:

Suction: O. K. ..... Reset ..... Connection: O. K. ..... Tighten .....

16. Generator:

Charging rate ..... Should be ..... Gen. voltage .....

Dash Ammeter Test ..... Brushes ..... Brush Spring tension .....

Commutator ..... Fan belt ..... Cut-out ..... Field voltage .....

17. Startrx:

O. K. ..... Adjust ..... Replace .....

18. Radio:

B Battery or B Eliminator voltage .....

19. Horn:

Wiring ..... Tone Quality ..... Button .....

20. Lights:

Wiring ..... Head Lamps: Dim ..... Bright ..... Parking .....

Tail ..... Stop ..... Inst. Panel ..... Dome .....

21. Windshield Wiper:

Operation ..... Blade ..... Hose .....

22. Oil Filter:

Mileage since last replaced ..... O.K. ..... Replace .....

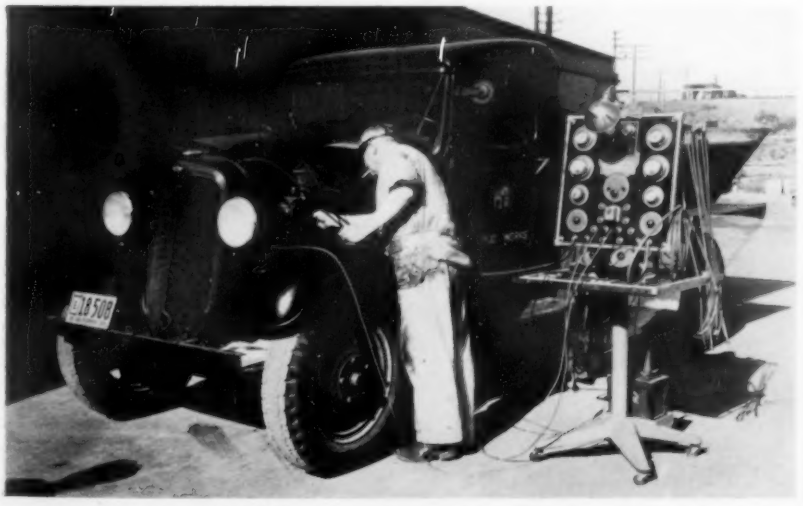
23. Cooling System:

Water Pump ..... Hose ..... Fan Belt .....

Radiator .....

Operator .....

Form 270, Measuring 8½ x 11 Inches, for Recording the Engine Tune-up Tests



Using the Motor Tuner on a Refuse Truck

Lubrication—Form 741

Form 741 refers to the lubrication of the equipment and is divided into four parts: B-service for trucks that have operated 500 miles since the last servicing; C-service for every 1,000 miles of operation; D-service for every 2,000 miles; and E-service every 6,000 miles. These refer to the service which is given to every well-groomed piece of automotive equipment at these intervals.

When a truck group is brought into the lubrication shop, a copy of Form 741 is made out for it, and every item that is attended to is checked off. A blackboard in the shop shows what is to be done to each truck in the group. This is prepared in advance, so that there

is no delay in getting to work on any piece of equipment. The trucks are listed across the top of the form in such an order that the check marks will fade off to the right with less being done to each truck in the group. This is a double check on the system, for if the check marks do not come out that way an immediate investigation is started to find out why.

Inspection After Lubrication—Form 740

Form 740 lists three additional services that must be performed on the truck, and at the same time the lubrication is checked to see that nothing has been overlooked. This work is done in a separate shed from the actual lubrication. The trucks which have received the B and C service on Form 741 receive the F service on Form 740. Letters "G" indicate 2,000-mile service, "H" 6,000-mile service.

All this work is done at night except the motor tune-up, which is done during the day when general repairs are in order. The night work is done by men of the "truck driver" rating and helpers, while the tune-up tests are made by "auto mechanics." Repairs are made by "auto mechanics and apprentices." The city also employs an "auto body man and welder" and a "utility man, auto" under the civil service ratings for work in the yard.

The Shops at the Central Yard

There are a number of specialized shops at the central yard taking care of keeping the trucks of the Refuse Collection Division at work. These shops will be described briefly as follows:

Blacksmith Shop.—The old blacksmith shop is now being converted into a body repair shop and is equipped with a Hobart electric welder.

Repair Shop.—This truck repair shop has three pits with overhead as well as adequate underbody lights, and is equipped with 1½-ton Shaw overhead crane for removing engines and handling the trucks themselves as needed.

Machine Shop.—This shop is devoted to repairs to the truck engines, valve facing and re-boring,

Form 741 for Checking Lubrication and 740 for Inspection, Each 8½ x 11 Inches

and includes an electric shop where repairs are made to carburetors, and batteries are charged. It also has a portable tune-up machine, which can be used anywhere needed in the yard. Equipment here also includes a Hobart generator tester, a small lathe and a Manley Mfg. Co. motor stand to make it easier to work on the motors and move them from one place to another. When work is to be done on a motor, the additional life that the rebuilding will give to the truck is estimated and the motor is reconditioned to the point where it will serve the rest of the life of the truck. It is aimed to have the reconditioning of the motor come at the half-way point in the life of the truck, or between 30,000 and 35,000 miles for the average truck. In this shop the motors are stripped completely and examined for failure and the extent of wear. If the wear is appreciably less than one-half the allowable wear, nothing is done, for it is figured that the part will last the rest of the life of the truck in the service of the city.

Inspection Building. — This building is used for the daytime tuning of motors and has a blackboard on which are noted the various tests to be made on the different motors, with a clip for additional notes on breaks that should be attended to before the motor is again placed in service. The Weidenhoff engine tester is used here in conjunction with a Richfield exhaust gas analyzer.

Steam Cleaning Building. — In this building the trucks and motors are given a complete cleaning before going on to the greasing stand. Formerly the trucks were so cleaned on alternate greasings, but it is found that no extra soap is used with the every-greasing schedule, and the work of the men doing the greasing is greatly improved. A Kerrick Kleaner steam generator and a soap compound are used with steam at 70 pounds pressure to clean the engine and chassis. A pair of 10-hp Ingersoll-Rand compressors in this building supply air all over the yard for every kind of service. There are two pits end-to-end in this building. At the first

(*Continued on page 69*)

In Pennsylvania

Parking Meters in 17 Cities

without exception have fulfilled the purpose for which they were installed

By Louis B. Dietz
Research Associate, Pennsylvania Economy League

MORE than 6,000 meters line the streets of 11 cities and 8 boroughs in Pennsylvania, from the borough of State College, with a population of 4,500 and 96 meters, to Scranton, of more than 143,000 population and operating 900 meters. Coverage of the business district ranges from 100 per cent in Carnegie, Sharon and Uniontown, to 50 per cent in Lewistown and Marcus Hook.

Without exception, the 17 units (out of a total of 18) which submitted replies reported that the principal objective was to aid in traffic control. Marcus Hook, for example, sought to "relieve traffic congestion, stop all-day parkers." Meadville's purpose was to "provide more parking space, aid traffic control, relieve congestion and double parking, and prevent abuses."

Reduces Police Work

A second reason apparent from the questionnaire returns was to relieve the police department of much parking regulation work. Municipal authorities reasoned that it would require less time for an officer to patrol a metered area and, by glancing at a meter, determine if a car were over-parked, than it would for the same patrolman to make some note of the time of parking and return at the end of a specific period to ascertain whether the car had been moved. Thus, a portion of the force assigned to parking enforcement could be utilized elsewhere.

Can Only Gain

Municipalities assume little risk in installing meters, in view of the reported terms of the meter contracts. With the exception of Shenandoah, every unit had the meters installed for a trial period, during or at the end of which the meters were removable on formal request. In so doing the unit assumed no liabilities and in most cases they stood to gain because the receipts of the trial period, after deducting the costs of installation, were distributed on a prescribed proportion between the municipality and the vending company. The portion that the government received was entirely clear, since it did not have to make any previous outlay.

No Removals Ordered

No municipality in Pennsylvania has ordered the removal of the meters after the expiration of the trial period, or any subsequent time. With the exception of Lewistown, all retained the meters after the original trial. Lewistown, after the completion of a 90-day trial, had the period extended by an additional 90 days.

The purchase of meters, in all cases but one, involved no expenditure of money on the part of the municipality. State College Borough purchased its meters outright, thereby securing a $5 discount per meter.

Ordinances Cover Operation

Every unit which installed meters adopted a special parking meter ordinance. Generally, these followed a similar pattern, specifying where the meters should be placed, during what hours they should be in operation, what details of enforcement should be employed.

Only one municipality, New Castle, has been involved in any litigation over the meters. There, the legal right of the City Council to install meters was questioned in the Quarter Sessions Court, which, upon hearing the case, handed down a decision that the meters were legal and dismissed the case at the cost of the plaintiff.

Pennsylvania municipalities all require that the meters be observed only during certain hours of the day. These hours are obviously fixed to meet the local conditions, but in general the meter period starts at 8 or 9 A.M. and ends at 6 or 7 P.M. Many of the units extend the required observance on Saturdays until 9 or 10 P.M., and none operates its meters on Sunday or holidays.

There is no standard schedule of parking meter rates throughout the state. Although a nickel appears to be the basic charge, the length of time permitted for the sum varies. Two of the units, Waynesboro and State College, have meters which will take either a nickel or a penny.

All seventeen of the boroughs and cities reported that allowances are made for special types of parking. Practically all permit free loading and unloading in the meter spaces, although some units have established special meterless zones for such functions.

Provide for Brief Stops

Provisions likewise are made by many of the units for the short parker who desires to stop to make a small purchase or pick up a package. Carnegie, for example, permits ten minutes' free parking without inserting a coin in the meter, but reports that under such a

provision it is difficult to enforce the meters, because the parker frequently gives the excuse that he intends to park for only five or ten minutes. Oil City has meters which, by a turn of the handle without inserting a coin, provide ten minutes of metered parking, one such period being allowed to each parker.

Ten municipalities stated that they permit a parker to deposit successive nickels as each period elapses. Harrisburg reported that the deposit of only one additional nickel is allowed; after the time paid for by the second nickel elapses, the car must be moved. Municipalities that do not permit re-parking generally have a clause in the meter ordinance which specifies: "It shall be unlawful for any person to deposit or cause to be deposited in a parking meter a coin for the purpose of extending the parking time beyond the time fixed herein, or in other ordinances of the city, for parking in the space alongside or next to which the said parking meter is located."

In 16 municipalities there appears to be a widespread belief that the meters must be rigidly enforced if their full value is to be realized. The details of enforcement vary with the municipality. Some units assign foot policemen to patrol the metered area: others use motorcycle policemen, and some have policemen who patrol the area on bicycles. In Uniontown, one patrolman is dressed in civilian clothes.

The usual procedure on discovering a parking violation is to tag the car. Upon return of the tag the violator is fined, usually $1. Lewistown exonerates non-residents if they furnish a reasonable excuse. Oil City does not fine first offenders and generally considers the circumstances causing the overtime parking. If $1 fine is not paid within 48 hours in Waynesboro, costs are added.

Traffic Control Improved

Without exception, these 17 parking-meter cities reported the meters to be aiding their traffic situation. Typical of the replies was Harrisburg's: "Certainly meters have made parking spaces more available, reduced double parking, and eliminated the all-day parker." Scranton reported that the meters have "aided materially in solving our traffic congestion, street cars have increased their time, fire apparatus can move more freely." Marcus Hook found that they have "greatly relieved our traffic problem and . . . many headaches." In fact, there appears to be a unanimity of opinion that meters have completely fulfilled their primary purpose of alleviating many traffic ills.

Public Reaction Favorable

Meadville officials sent over 1,200 questionnaires to residents of the city, suburbs, and surrounding rural areas, and received 420 returns. Of those replying, 84 per cent of the city residents favored the retention of the meters, as did 70 per cent of those residing along adjacent rural routes. In answer to the question, "Would you approve of the removal of the meters and have unlimited parking time in the present metered district?" 286 replied "No" and 35 "Yes." When the non-city residents were asked what effect the meters had on their trading in Meadville, 36 indicated it favorably affected their trade, 14 stated an unfavorable effect, and 63 replied the meters made no difference.

Of the 15 Pennsylvania municipalities which submitted complete answers to the League's questionnaire, not one indicated that the public reaction within their unit has been other than favorable toward the meters.

The greatest unanimity of opinion was disclosed in the reaction of the municipal officials. Answers to this query read, "Satisfied," "Quite favorable," "Convinced of merits from beginning," "100 per cent for meters."

Milwaukee's Midsummer Festival

FOR eight days and nights, through July 22, the people of Milwaukee enjoyed the festive and exciting events of their sixth annual Midsummer Festival. Held in Juneau Park, at the lake-front downtown, the program opened with motorboat and sailboat races, and a marine pageant. On following days, local youth presented a gymnastics exhibit, Milwaukee singing societies held a songfest and opera, Shakespeare and children's plays were given in the Playhouse. One of the most interesting events was a Citizenship Rally. Among the many other activities were dare-devil stunts, a log-rolling act, side shows and fire works—all of which added to the gala air. The final event was a spectacular pageant, "America All," participated in by all the 32 nationality groups in Milwaukee, and depicting the unification of these groups living as good neighbors under one flag. In connection with an entertaining and educational stage-lecture feature, "Wonders of Modern Electricity," the Milwaukee School of Engineering held various exhibits.

Exhibition Tent of the Milwaukee School of Engineering at the Milwaukee Midsummer Festival, July 15-23, 1939

IN 1936

The piles of industrial waste, slag and junk along Cleveland's lake front, three years ago, shown at the left, are pictured at the right in process of being torn down and spread out in the lake, while construction had begun on the shore drive

IN 1939

These two views, taken from the same point midway between East 9th Street and Gordon Park, Cleveland, show the progress of the lake-front improvement development

Cleveland Improves Its Lake Front

By Robert Hoffmann
Consulting Engineer, City of Cleveland, Ohio

The shores of Lake Erie in the Cleveland area have for many years been used by industrial concerns as a dump of waste material. In 1917 statutes were passed by the state of Ohio, which has title to the land, authorizing the cities of the state to develop the property in front of the natural shore line for navigation and water commerce. City Manager Hopkins in 1926 proposed the development of the Cleveland outer harbor. The Federal Government established a harbor or pierhead line and bulkhead line within the Federal breakwater, and thus created a most adequate and useful artificial harbor.

Little was accomplished in the carrying out of the improvement of the harbor by reason of the cost of the improvement and the inability to persuade business concerns which had title of the upland to cooperate with the city in the development of more adequate shipping facilities. The property therefore continued to be used as a dump of waste material until 1935.

Early in the administration of Mayor Harold H. Burton, the City Council approved ordinances which made it possible to provide the necessary roadway as a means of ingress to and egress from the piers, wharves and docks located on the harbor. Prior to the construction of the roadway, the upland owners found it necessary to build private roads in order to make any use of the property for navigation purposes.

The roadway is primarily constructed to serve navigation and water commerce. It, however, provides an improvement whereby motorists may reach the business districts of Cleveland, and relieves

congested and crowded conditions of city streets. It is believed that ultimately the development will not only save time and be a great convenience to motorists, but will save life and property, in that it prevents traffic congestion.

A Vast Amount of Readjustment Work

The city of Cleveland secured a grant of WPA funds, and the work was started in 1935. The roadway is approximately four miles in length and extends from Gordon Park, one of the large recreational centers of Cleveland, directly into the business district of Cleveland. The project involved the moving of a vast quantity of materials. The slag and junk piled along the lake front, which had accumulated over thirty years of public and industrial plants' dumping, were torn down and spread out into the lake. Fences were ripped out and buildings moved. Sewers and industrial water intakes and outlets were extended far out into the lake. It was necessary that a great amount of riprapping be placed on the exposed side of the fill in order to minimize the loss caused by wave action during frequent storms. More than 62,000 tons of steel mill "ladle skulls" and broken stone were placed as riprap along sections of the roadway which were exposed to severe wave action.

Protection Against Erosion

A low rubblestone sea-wall some 700 feet long at East 72nd Street, and another higher wall of about the same length between the intake and discharge tunnels of the Cleveland Electric Illuminating Co., were necessary to protect the filled material along the roadway. The construction of the road was carried on both summer and winter, and a great amount of filling, riprapping and bulkheading was necessary by reason of the fact that the natural process of the wind and waves upon the shore is erosion. WPA spent approximately $7,000,000 for labor, and to this amount has been added the necessary expenditures by the city and WPA in the furnishing of material and equipment as required by the WPA agreement.

The Roadway Plan and Lighting

The drive is paved with a 9-inch course of waterbound macadam, with 3-inch bituminous macadam wearing surface. Its width for most of the length is 50 feet from curb to curb, and has a 6-inch crown. The curb is set for a 9-inch gutter, so that an additional wearing surface may ultimately be applied if desired. All curves are super-elevated. The equivalent of sixteen blocks of the drive adjacent to Gordon Park is constructed with two 34-foot traffic lanes, divided by a 12-foot lawn center strip.

Modern street lighting has been installed at intervals of 120 feet along the southerly curb line of the entire roadway. Brackets extend 10 feet out over the drive. The luminaries cast rays directly on the pavement, illuminating it without glare. These units, which have 6,000 to 10,000 lumens, including also two 6,000-lumen sodium fixtures, are being used by the city as an experiment with this new type of lighting fixture. The types installed include Westinghouse Reflectolux Junior, 79 RGE, 79 DGE, and an Admiral Hat 84 GE. It is intended to install eventually lights along the northerly curb line.

The city has also secured a grant from the Federal Government (WPA funds) to beautify the territory on both sides of the roadway, which is necessary until such time as proper industrial use can provide a suitable use of the property for navigation and water commerce. The ultimate plan of the roadway contemplates a separate truck highway and marginal railroad for the use of the property in aid of navigation and water commerce. There is also a definite thought in the minds of many prominent citizens of Cleveland that the property should be developed for recreational purposes and as a landing field for airplanes, but all these programs have as yet not been fully approved by the administration.

This development has not only provided the roadway which has been fully described, but has made it possible for Cleveland to remove an unsightly dump and develop an interesting skyline.

Modern Swimming Pools Reduce Drowning Tolls

MILLIONS of Americans are swarming on the beaches, streams and pools, many of them in the municipal swimming pools provided with WPA aid during the last three years. These include 471 new swimming pools and 225 improved, and 440 new wading pools.

Drownings in modern pools are rare. Drownings among those who take chances in flooded gravel-pits, pumping-station outlets and dangerously swift river currents are all too frequent, as the following statistics of annual drownings show:

1933	7,467
1934	7,326
1935	7,108
1936	6,908
1937	7,482

The new pools are of various designs. Some almost ultra-modern pools have been constructed where secondary uses justified the extra cost, as at Shushan Airport in New Orleans, where the pool also serves as a reservoir that can be tapped in the event of fire. The type of pool is unimportant—the idea is to build the best possible.

Solida, Calif., has a natural warm mineral-water pool with the water piped five miles from some hot springs. A new pool at Rockford, Ill., has been especially equipped for the use of children afflicted with infantile paralysis. Residents in arid sections of the Southwest enjoy swimming facilities never available before.

Negroes have benefited particularly under the WPA program. In the North and in the South special pools have been built for them. At Camden, N. J., an $84,000 swimming pool and recreational center was constructed in the midst of a slum district for that city's colored population.

In many cities where slums were torn down to make way for recreation centers their destruction contributed toward improvement of the standard of living of entire communities.

Put Underground Structures in Streets Systematically

Sewer, Water, Gas, Electric and Heating Lines Must Be So Located as to Minimize Conflict and Maintenance Costs

By George R. Thompson
City Engineer,
Detroit, Mich.

THE service facilities which are customarily placed under the street surface between property lines are: (1) sewers, separate or combined; (2) water pipes, both high- and low-pressure systems; (3) gas pipes; (4) electric conduits, including those for street lighting, power and communication wiring; and (5) heating mains. There are other structures, such as building foundations, building areaways, underground transportation and parking facilities, and large tunnels for water supply and intercepting sewers, which are so highly specialized that they cannot properly be considered under general treatment. However, the probability of such cases occurring should not be overlooked in arranging space for the more usual and common structures.

If the problem of properly locating the more common underground structures could be reduced to its simplest terms by assuming a static condition of local frontage demand, along the street, and distant demand through the street and beyond, including surface demands for traffic, it would be relatively easy to obtain a correct solution from the ordinary principles of engineering economics and design, for both construction and maintenance.

Planning for static conditions is of course, purely theoretical, since every street is subject to constant change because the property it serves, both local and distant, is in a constant state of change. Such planning, however, has the advantage of developing certain essential purposes which, with reasonable application to estimated future requirements, are of general use.

Factors Affecting Locations

The following factors naturally affect the planned location of the underground structures under discussion:

1. They should be at a minimum depth below the surface to properly serve their purposes and to minimize the cost of excavation in construction and maintenance.

2. They should be located so as not to interfere with each other either horizontally or vertically, nor when crossing each other.

3. They should be located so as to provide taps from abutting property and service in public property at a minimum expense in construction and maintenance.

4. Other things being equal, they should be so located as to be accessible for repairs and replacements with minimum damage to surface structures and interruption to traffic.

As an example of the foregoing, there is presented herewith a sketch of a typical cross-section of Woodward Avenue, the main street in Detroit, showing the approximate location of various services after widening this thoroughfare from 74 feet to 120 feet. Woodward Avenue carries a trunk-line sewer, which is far below the depth of any other structures and serves no local properties direct. The local sewage is carried by sewers in alleys in the rear of the property. The water mains and gas mains have been located under the sidewalk, as it has been found in Detroit that these services require most surface disturbance for general maintenance and for changes in taps. Street-lighting conduits are placed under the sidewalk immediately adjacent to the curb to serve the poles located along the curb lines.

As a result of Detroit's experience in street widening, this arrangement of underground structures will be generally adopted hereafter when major widenings permit their logical location. Credit for this plan is due Laurence G. Lenhardt, who was Commissioner of Public Works at the time of the major street widenings in Detroit.

Advantages of Duplicate Services

As street widths have increased because of traffic density, and as heavier pavements have been built for heavy traffic, there is a tendency toward running duplicate services on each side of wide streets, permitting short taps to abutting property, instead of long taps across the streets, which are necessary for single service.

The following table for water mains, based upon uniform estimates of construction costs for comparative purposes, shows when double lines are less costly than single lines of water pipe for varying sizes and street widths. For example, an 8-inch single main in a 60-foot street, complete with taps to the property line, can be laid at the estimated cost of $3.37 per lineal foot of street, which is less expensive than its alternate, a double line of 6-inch pipe at $4.25. However, in a 120-foot street the conditions are reversed, for the 8-inch line will cost $4.50, whereas the duplicate 6-inch line will cost but $4.25. It will also be noted from the table that in the case of the 120-foot street, the double pipe in all cases is less expensive than the single, but in the narrow street the saving by reason of the double pipe does not occur until there is a demand equal to that of a 12-inch pipe, where the 12-inch single pipe costs $6.62 versus $5.25 for double pipe.

The next table is similarly prepared for sewers. In this table a typical run of 1,600 lineal feet of lateral sewer was assumed, increasing in size every 320 feet. In the

case of the single line of sewer, the "Y's" are extended to within 10 feet of the property line, which is the dividing line of cost between private and public property in Detroit, and in the case of the double line the line is located 10 feet from the property line, and the "Y" connection only is provided.

The sewer increases in depth from 8 feet to 16 feet and is assumed to be built of vitrified pipe in open cut in clay, machine-excavated. The average distance between taps is 40 feet. Within the limits of this table, it will be noted that the single sewer is less costly than the double in the 60-foot street. In the 80-foot street, the double sewer is less costly than the single, until the demand is reached for a 24-inch sewer, in which case the single 24-inch sewer is cheaper than a double 18-inch sewer. In the 100- and 120-foot streets, the double sewer in all cases is less expensive than the single.

Similar tables to those given on water and sewers could readily be worked out for other service facilities. In all cases the figures will vary somewhat, dependent upon soil conditions affecting excavation, frequency of taps and desirability of cross-connecting such services as water mains, gas and heating pipes.

Use of Service Tunnels

The comparative economics for maintenance has not been developed in these tables, although this is an important consideration in which weight must be given to the type of pavement to be disturbed for repairs to the underground structures.

COMPARATIVE COSTS OF WATER MAINS PER LINEAL FOOT OF STREET INCLUDING SERVICE CONNECTIONS

A—Single main in street serving both sides
B—Main on each side of street serving each side separately

		60-Ft. Street		80-Ft. Street		100-Ft. Street		120-Ft. Street	
A Single	B Double	A Single	B Double	A Single	B Double	A Single	B Double	A Single	B Double
4"	4"	$2.62	$3.75	$3.00	$3.75	$3.37	$3.75	$3.75	$3.75
6"	4"	2.87	3.75	3.25	3.75	3.62	3.75	4.00	3.75
8"	6"	3.37	4.25	3.75	4.25	4.12	4.25	4.50	4.25
12"	8"	6.62	5.25	7.00	5.25	7.37	5.25	7.75	5.25
16"	10"	9.12	8.25	9.50	8.25	9.87	8.25	10.25	8.25

Note: The capacity of the double mains is equal to the capacity of the single main as closely as practical.

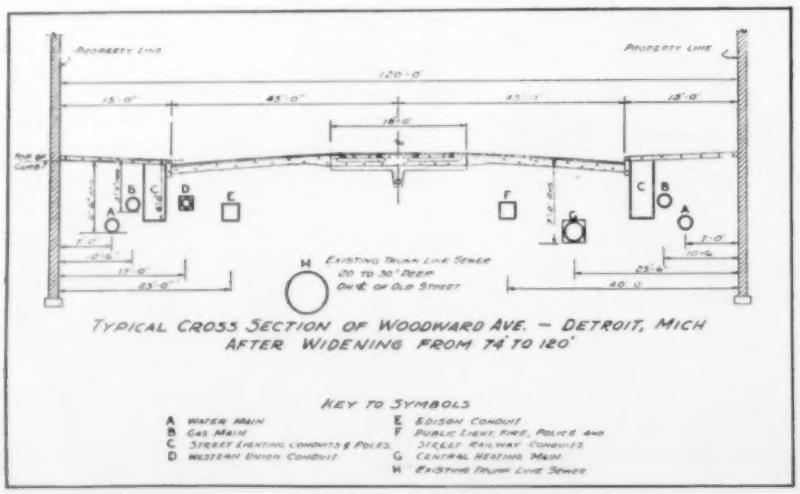
COMPARATIVE COST OF LATERAL SEWERS PER LINEAL FOOT OF STREET INCLUDING Y's

		60-Ft. Street		80-Ft. Street		100-Ft. Street		120-Ft. Street	
A Single	B Double	A Single	B Double	A Single	B Double	A Single	B Double	A Single	B Double
12"	10"	$2.20	$2.38	$2.68	$2.38	$3.16	$2.38	$3.64	$2.38
15"	12"	2.56	2.74	3.04	2.74	3.52	2.74	4.00	2.74
18"	15"	2.85	3.25	3.33	3.25	3.81	3.25	4.29	3.25
20"	15"	3.15	3.25	3.63	3.25	4.11	3.25	4.59	3.25
24"	18"	3.84	4.54	4.32	4.54	4.80	4.54	5.28	4.54

Note: The capacity of the double mains is equal to the capacity of the single main as closely as practical.

Serious consideration should be given to the carrying of underground facilities, except gravity sewers, in service tunnels, on one or both sides of major streets. In our larger cities, an occasional glimpse of underground construction showing the maze of pipes and conduits constituting the nerve centers of a big city, and a realization of the number of times these have been disturbed for repairs and replacement, makes this plan seem logical. Industrial plants and large institutions have found the placement of service facilities in tunnels desirable, for although this design may be high in first cost of construction, it affords advantages in maintenance, repairs, changes and non-interruptions to surface conditions, which seem to justify its rather common usage.

Problems of ventilation, insulation, drainage and other design details for each of the various facilities placed in the tunnel would naturally have to be given special consideration. Grave explosion hazards from leaks in gas mains would have to be considered if gas pipes of present type of construction were placed in tunnels. High-tension power lines might require encasement within the conrete tunnel walls. On the face of it, it would appear that the application of tunnel construction for carrying underground structures would be limited to special cases, even in a relatively large city.



TYPICAL CROSS SECTION OF WOODWARD AVE. — DETROIT, MICH
AFTER WIDENING FROM 74' TO 120'

City Planning and Zoning Will Help

Unfortunately for the solution of proper allocation of space for underground structures, streets are not in a static condition. Narrow trails have become wide traffic arteries. Private property abutting the residential street has changed from suburban to urban occupancy. The underground structures which serve that abutting property must change with its development in use and occupancy. The ability to foresee these changing conditions with reasonable accuracy is the difficult part of this problem. The changes that we in our careers have witnessed could hardly have been considered reasonable by our predecessors, whom we are prone to criticize for lack of foresight. The changes that are to come in the future may seem as unreasonable to us. As practical engineers, we must plan for such changing conditions, but without going to unwarranted extremes, as envisioned by Sunday newspaper supplements in their city of the

future. Our concern is in the present with its lessons from the past, plus reasonable provisions for the future rationalized on sound economic grounds.

Most city streets were not brought up according to a predetermined plan, they rather grew up on the expedient basis of first come, first served in allocation of underground space.

Expedient Locations

Sewers with their comparative great depth arrived first underground and usually occupied the approximate center of the original street in order to equalize the length of taps from adjacent private property. Trunk or main sewers continue to be similarly located. Lateral sewers intermediate between private property and trunk sewers are now generally located when possible in the rear of private property, in alleys or easements. Street drainage from catch-basins is carried into trunks, where available, or by the easiest method to a lateral. Because of their depth, sewers generally avoid interference with other structures and as they seldom need to be dug up for repairs, their location under pavements or paved alleys is not seriously objectionable.

Water pipes require frequent uncovering for repairs or taps and should therefore be located in a readily accessible part of the street behind the curb line, under grass plots or sidewalks. The duplication of water mains, that is, one on each side of the street, is of particular advantage in business and congested areas, for greater fire protection is given with a looped system, with fire hydrants on each side of the street, fed from both directions. Water pipes must be located below the frost line and their depth coordinated to that of gas and other structures so that they will not interfere with each other.

Gas pipes are subject to the most frequent need for uncovering to make repairs and taps and should also be located back of the curb to minimize repair costs, including damage to street pavement and interruption to traffic. The advantages of looping gas pipes, with one on each side of the street, is similar to water service in providing a two-way flow.

Electric conduits seem to require less disturbance for maintenance and repair than most underground structures, and the changes of cables and conduits can generally be accomplished from splicing chambers. There is little objection, therefore, in placing this group of structures under the street pavement. However, for the purpose of street lighting, these conduits are most conveniently located on both sides of the street.

Heating mains may be considered from the same viewpoint as gas mains, although experience in Detroit indicates that these lines are disturbed less than either gas or water. They should be located preferably behind the curb line, unless placed in tunnels. In many sections of Detroit, the steam mains are located in deep tunnels, accessible for their entire length, and their repair is therefore not a hazard to street pavement. Local heating lines are in comparatively shallow trenches, which are occasionally tapped. In all cases the expansion joints which require most attention are in manholes and are readily accessible.

Lack of Planning Is Costly

While this subject may be classified theoretically as of utmost simplicity or, on the other hand, as one of infinite complexity and impossible of accurate solution, it is evident from costly experience in permitting hit-or-miss planning in the past, that something should be done about it in a forward-looking common-sense way. I have been informed that in one city in Michigan, with a population of 65,000, a private service corporation estimates an expenditure of over two million dollars for lack of proper planning of allocation of space. The writer has obtained no figures from other service corporations in larger cities, but on a comparative basis from the above example, the cost due to improper planning of underground services must be enormous. That these costs are borne by the utilities is no excuse for their unnecessary incurrence, because in the final analysis the consumer must absorb them.

Aiming at the best solution possible as a practical consideration, it would seem that two things are necessary:

First, proper planning for the present and immediate future, together with rational provision for the distant future.

Second, control of the situation to see that the plan is adhered to or modified intelligently.

The City Engineer as Planner

Consideration should be given to the proper planning agency. I believe the proper agency is the city engineer. This at least is true in Detroit, where the City Charter places the control of streets under the jurisdiction of the commissioner of public works, with the city engineer as his assistant on all matters pertaining to engineering. Naturally, the engineer will confer with other interested parties, such as the service corporations, both public and private, who utilize the street, and will not overlook planning boards who coordinate all phases of city developments.

Control

In the matter of carrying out the plans, it would seem logical that the city engineer had control of the consummation of the plan which he had prepared. To make this effective, underground records must be made as lost information comes to light in various street excavations. Street excavations must be controlled by a permit inspection system. It is a charter provision in Detroit that no street may be opened by any public or private organization without having first obtained a permit from the city. This serves as notice to our permit inspectors that an opening is to be made, and they get on the job to see that the exacavation is properly backfilled and street surface replaced. This also gives them an opportunity of recording underground observations. It is of course desirable that pavements be disturbed as infrequently as possible. A penalty clause on openings within a short time after paving serves as an encouragement to abutting property owners to have their taps made before paving takes place.

It is the practice of Detroit to give notice to utilities at the begin-

(*Continued on page 70*)

1,500-Hp Diesel Added to

Municipal Plant Quickly Outgrown

By R. W. STROHMEIER
Superintendent, Municipal Electric Plant, Hutchinson, Minn.

THE successful first-year operation of our diesel-electric plant was described in the May issue of this magazine.

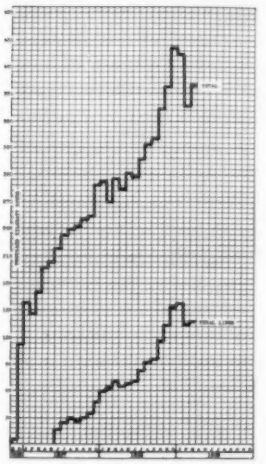
The most interesting development during the second year of operation, ending last March 31, was the rapid heavy increase in load which necessitated the installation of a new 1,500-hp diesel engine in addition to the original three 625-h_p engines.

In May, 1938, contract was awarded to the Nordberg Manufacturing Co., of Milwaukee, for a 6-cylinder, 17-inch bore by 25-inch stroke, 257-rpm, 2-cycle engine of 1,500-bhp direct connected to a 1,250-kva 0.80 power factor, 60-cycle generator. This unit was placed in regular service on October 23, and immediately proved to be very useful during the seasonal peak-load period which resulted in a station peak on December 24 of 1,380 kw.

Customers of various classifications during March, 1939, numbered 984 residential, 208 commercial, 82 power, 13 commercial heat, 104 water heat, and 4 wholesale, a total of 1,395, a gain of 85. One of these is the McLeod Cooperative Power Association, with 1,590 customers, as compared to 803 a year ago.

Net sales for the fiscal year ending March 31, 1939, amounted to $105,998 after discounts and allowances of $4,175 from gross billings of $110,173, a net gain of $20,201. Total generation was 4,294,780 kwh., a gain of 1,317,800, or 44.3 per cent. Of this total, station use amounted to 230,780, and line losses 215,443, 3,848,557 being sold. The line loss amounted to the very low figure of 5.3 per cent of plant output.

The previous high efficiency of the plant was bettered slightly, the kwh generated per gallon of fuel being 13.68 against 13.4 during the previous year. The kwh per gallon of lubrication oil increased from 2,351 to 2,870.



Two Years' Total (Top Curve) and Rural (Lower Curve) Electric Load

Average load factor was increased from 52.5 per cent to 63.6 per cent, plant capacity factor from 26.3 per cent to 28.4 per cent, and thermal efficiency from 32.7 per cent to 33.5 per cent.

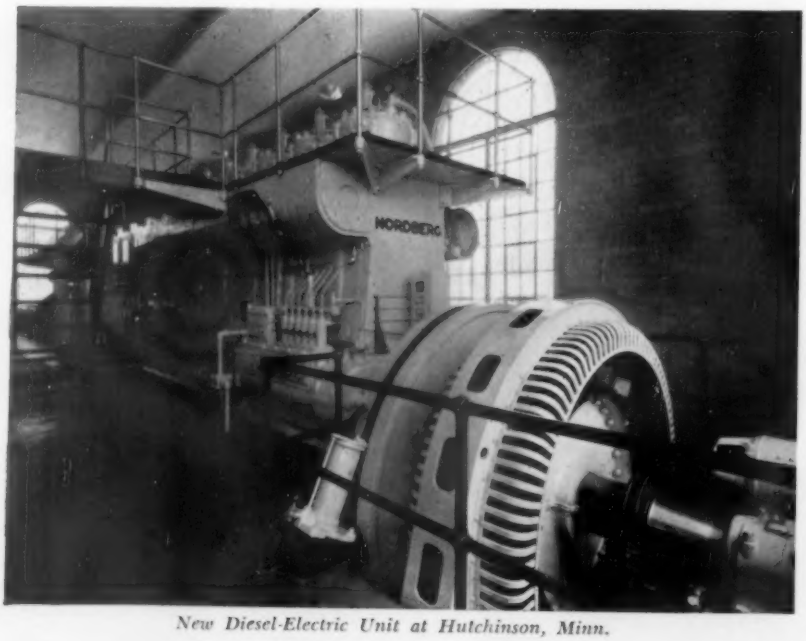
Sales by customer classification are given on the next page.

Of the plant expenses, the principal items were $17,018 for fuel oil and $6,747 for labor; repairs and maintenance being $1,422, which included complete overhaul of the three 625-hp units. Distribution expense included labor, $6,194, and truck expense of $578. Administrative and general charges included $2,867 for installation and advertising, clerical salaries of $1,392, and Commissioners' salaries of $300.

Depreciation of $15,748 was charged, being itemized as follows:

Building	$1,055
Machinery and equipment	8,856
Switchboard	442
Tools and other equipment	184
Distribution system	4,914
Auto trucks	197
Office equipment	120
	$15,748

Capital assets March 31, 1939,



New Diesel-Electric Unit at Hutchinson, Minn.

consist of land, $3,500; building, $52,758; machinery and equipment, $220,281; switchboard, $9,010; distribution system, $101,137; tools and other equipment, $2,341; trucks, $987; office equipment, $1,284; totaling 391,298. Against this, depreciation of $32,145 has been charged. Bonds outstanding consist of $190,000 Series A bearing 3¼ per cent interest, and $26,000 Series B 3½ per cent, and pledge orders outstanding $84,000 at 3½ per cent interest covering the installation of the new Nordberg unit. Debt retirement of $49,000 was made during the year, most of this being far in advance of maturities.

During the year a general rate reduction was made, the following rates now being in effect; all being subject to 5 per cent discount for prompt payment:

Residential: first 40 kwh @ 5½ cents; next 60 @ 3½; next 250 @ 2; excess @ 1½ cents.
Water heating: all kwh @ 1.05 cents.
Commercial heating: first 200 kwh @ 4; excess @ 3 cents.
Commercial lighting: first 50 kwh @ 8; next 100 @ 5.5; next 350 @ 4.5; next 1,000 @ 3; next 1,000 @ 2; excess @ 1.5 cents.
Power: first 200 kwh @ 5.5; next 300 @ 4.5; next 500 @ 3.5; next 1,000 @ 3; next 8,000 @ 2.5; next 10,000 @ 2; excess @ 1 cent.

SALES BY CUSTOMER CLASSIFICATIONS AND TWO YEARS' STATEMENT

Customer Class	Kwh	Customers	Kwh per Customer
Residential*	743,766	961	774
Commercial lighting	431,209	199	2,167
Water heating	257,902	97	2,659
Commercial heating	61,147	14	4,368
Power	767,204	81	9,475
Total retail	2,261,228	1,352	1,673
Street lighting	107,359	1	107,359
White way	105,382	1	105,382
Water pumping	61,738	1	61,738
Rural lines	1,303,300	1	1,303,300
Total	3,839,007	1,356	2,831
Unbilled sales†	9,550		
TOTAL SALES	3,848,557		

* "Residential" classification is exclusive of water heating. Kwh per residential customer inclusive of residential heaters for 1938-39 is 1,002, and for 1937-38 was 872.

† Denotes net unbilled sales March 16 to March 31, 1939, over previous year.

COMPARATIVE STATEMENT OF OPERATIONS

	Year Ending Mar. 31 1938	Year Ending Mar. 31 1939	Increase or Decrease
Sales	$89,533.22	$110,173.56	$20,640.34
Discounts and allowances	3,736.24	4,175.12	438.88
Net sales	85,796.98	105,998.44	20,201.46
Operating expenses—			
Plant	19,619.99	27,493.14	7,873.15
Distribution	6,807.50	7,853.59	1,046.09
Administrative and general	4,477.56	6,060.88	1,583.32
Total operating expenses before depreciation	30,905.05	41,407.61	10,502.56
Profit on operations before depreciation	54,891.93	64,590.83	9,698.90
Less depreciation	13,157.82	15,748.69	2,590.87
Net profit on operations	41,734.11	48,842.14	7,108.03
Plus non-operating income	.00	98.30	98.03
Less non-operating expense	9,898.59	9,508.28	390.31
Net income	31,835.52	39,432.16	7,596.64
Previous surplus balance	3,737.31	35,572.83	
Surplus balance	35,572.83	75,004.99	39,432.16

The Old Municipal Steam Electric Plant

By DR. M. J. ZUCROW
Hubbard Engineering Co.,
Consulting Engineers, Chicago, Ill.

IF THE municipal plant is to *be* a yardstick as well as to be *called* a yardstick, it will have to pare down operating costs by the use of improved machinery and methods.

Until recently the high capital charges of large private utilities enabled the municipal plant to compete even though it was relatively inefficient, with the result that in many cases there has been no stimulus for such plants to avail themselves of the most modern operating and design technique. The private utilities, on the other hand, have made great strides in modernizing and improving the operating efficiency of their plants, thus to some extent overcoming the handicap of their plants by reducing power production costs.

Today many private utilities by improved operation and by refinancing of their indebtedness to reduce capital charges, have caught up with some of the economic advantages formerly enjoyed by municipal plants. Now is the time for the latter to act. This will necessitate the expenditure of relatively large sums of money. It is highly important, therefore, that correct information on the economical production of electricity be available to those carrying this responsibility.

A recent survey of several municipal steam power plants by the author revealed their need to take full advantage of the advances made in the art of power generation during the last ten years. A few outstanding defects are:

1. Relatively low steam pressure and insufficient superheat; in most plants the throttle pressures were 200 pounds per square inch or less, where they should be 400 or 450 pounds.
2. Lack of heat reclaiming devices, such as air heaters, economizers, feedwater heaters.
3. Improper coordination between steam generating and electrical generating equipment.
4. Lack of proper automatic regulation equipment and instruments.
5. Lack of means for raising the power factor to reasonable values.
6. Poor operating records.

The resulting heat rate of some of the stations varied from 25,000 to over 35,000 Btu per kilowatt-hour, against 14,000 to 18,000 for modern plants of comparable size. Thus the possible reduction in fuel consumption amounts to from 30 to 50 per cent.

Those responsible for the activities of municipal power plants permit this condition to exist because power generation is a technical subject, and, being laymen, in most cases, they must be educated to an appreciation of the benefits which follow a correctly planned modernization program. The safe procedure is to have an unbiased engineering report on which to base a modernization program.

Attractive fuel savings await a large number of municipal power plants if correctly modernized. The practice of installing what might be termed "new obsolete equipment" must cease.

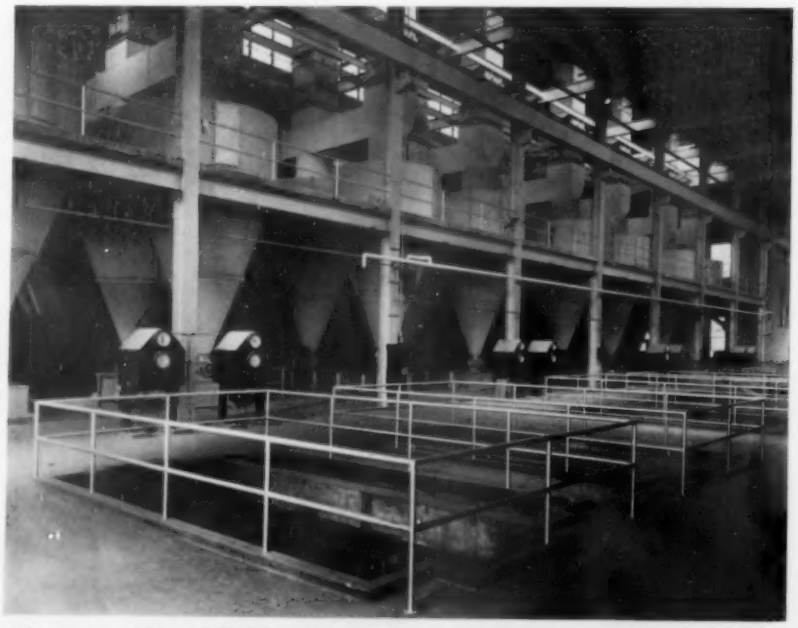
Weighing Sewage Sludge

Continuous Records Maintained at Chicago and Buffalo by Belt-Type Devices

SOME automatic device for weighing on a scale is necessary for the operation of a sewage-treatment plant where the sludge is being dewatered and dried and then either incinerated or processed for use as a fertilizer or soil conditioner. The operator depends upon such a weighing apparatus for his control, inasmuch as he wants to know at all times the amount of cake coming, in order to control the dryers or the incineration process. Extensive studies of various types of weighing belts have been made by William A. Dundas, Mechanical Engineer, The Sanitary District of Chicago, under the direction of William H. Trinkhaus, Chief Engineer.

For the weighing of material transported on a belt for disposal to an incinerator or a dryer in preparation for the sale of the material as a fertilizer, various makes of apparatus are on the market. In the development of the scheme of drying sludge at Chicago, it was realized early in the studies that a uniform feed is essential for such drying operations. The cake comes off the vacuum filters at Chicago with between 78 and 82 per cent moisture and is dumped onto a traveling belt. In order to break up the cake and make an even load on the belt, Mr. Dundas developed a series of vertical disks revolving around a horizontal axis, against the motion of the belt at a slow rate. These disks have teeth arranged to throw the material sideways from one disk to the other and break it up. The broken-down cake is then evened up by a cake spreader, which makes a uniform load upon the belt.

To give a record of the tonnage of the cake as delivered from the filters and also to indicate the rate of delivery, a weighing device was sought. In the experimental work at the West Side plant, which ran for several years, a Transportometer, made by the Sintering Corporation, was used. This received material from a single vacuum filter with a capacity of 20 tons of dry solids a day or, roughly, 100 tons of cake a day. In the development of the working plant at Calumet, which has been running now for over two years, the Merrick Weightometer is used, with a capacity of 12 tons of cake per hour. At the Southwest Works the Merrick Simplex Weightometer is installed, a less expensive device than the other Merrick unit mentioned. In this installation each scale has a capacity of 24 tons of cake per hour. Inasmuch as the filters are grouped by fours and each feeds a dryer-incinerating unit, there are eight of these machines installed.



The Battery of Merrick Weightometers Installed in the New Southwest Sewage-Disposal Works of the Sanitary District of Chicago

At both of the works of the Sanitary District of Chicago the details of the weighing platform of the scale are practically the same. The conveying belt runs over a platform. The scale is adjusted to read zero at running speed. The Weightometer has a recording and totalizing device which is built into a housing. As this device works on an electrical basis, it is possible to transmit the information and show both the recording and totalizing at a distance. The chart gives an indication in tons per hour. There is a certain amount of lag in the apparatus, so that a load which varies in small portions is more or less evened up.

The Merrick Simplex Weightometer at the Southwest Works employs the same scale as in the apparatus at Calumet. The difference is in the recording and integrating apparatus. There is also an indicator to show the weight of material passing per hour. The indicator, recorder and integrator are all built into one unit. This operates on a mechanical basis, and does not record as well on the chart although the integrator works successfully. A dampening device is available which obviates this difficulty. While this device can be arranged to transmit the information to a distance, it is not so arranged at the Southwest Works. The Simplex unit was specially redesigned for the Southwest Works.

Summing up the units in Chicago, it is reported that both ma-

chines integrate the weight passing over the scales accurately and both machines produce a record which is available. The Simplex machine has, further, a large pointer to indicate the amount passing momentarily. If the feed is non-uniform, the Weightometer gives a better result, inasmuch as it does not weigh instantaneous loadings but records intermittently. It has no indicator, and therefore the chart must be read to determine what is happening. The device is a good one and from the experience with the experimental West Side plant and the Calumet Works the Chicago Sanitary District is satisfied that the necessary records are obtained.

Buffalo Experience

The sewage-treatment project at Buffalo went into operation on July 1, 1938. All parts of the sludge disposal end of the plant were not ready for operation at that time, but are now operating continuously. The specifications covering the installation of sludge-disposal equipment required the contractor to install suitable sludge-cake spreading devices. When the specifications were written, early in 1937, there had not been a sufficient amount of operation at the Calumet plant in Chicago to make it seem proper for Buffalo to adopt the Calumet "cake spreader."

The sludge cake at Buffalo is quite different from the sludge cake at the Calumet plant. The Buffalo cake contains much less water, averaging less than 65 per cent, and is apparently tougher, so that it does not fall from the vacuum filters in small strips but in rather large sheets. Careful study of the "cake spreader" at the Calumet plant and of a similar device in operation for about a year at Kaukauna, Wis., led Greeley & Hansen, consulting engineers for the Buffalo plant, to the opinion that while the spreader is entirely satisfactory for conditions of operation at the Calumet plant, it would not be satisfactory for the conditions at the Buffalo plant. Partly because of the character of the sludge cake at Buffalo, the cake drops to the conveying belt in sheets, so that there is a tendency for a pile of sludge cake to alternate on the belt of the Merrick Simplex Weightometer with an empty stretch which at times is 8 to 10 feet long. At Buffalo it was felt that a cake-spreading device which provides for a few minutes of storage of sludge cake between the filter and conveyor belt would be most likely to be satisfactory, and such a device has been installed. It has been very successful and there has been no difficulty in keeping a record on the Simplex Weightometer at Buffalo from the indicator on the scale.

We are indebted to William A. Dundas, Engineer of Mechanical Design; Langdon Pearse, Sanitary Engineer; both of The Sanitary District of Chicago; and to Samuel A. Greeley, of Greeley & Hansen, consulting engineers, Chicago, for the information on which this presentation of the system used is based.

Organized Effort Cuts Juvenile Delinquency Rate 62 Per Cent

How THE CITY of Cleveland cut its juvenile delinquency rate 62 per cent by organizing youthful leaders of 45 gun gangs was told by Eliot Ness, Director of Public Safety of that city, at the University of Chicago on July 20.

Mr. Ness spoke before the eighth annual Conference of Administrative Officers of Public and Private Schools. Millions have been spent in efforts to cope with the problem of adult crime, he said. "I think the time is at hand when police officials, teachers and educators should join to prevent problem children from becoming criminals.

"All of our work is so recent that it is impossible to determine which method has been the most effectual. I believe that different cases, different areas, and different possibilities will suggest different means of approach. And while our primary activity deals with correction of an environmental situation, we are not neglecting the individual cases."

In the Cleveland effort, leaders of the gangs, which had previously engaged in thefts, hold-ups, and other marauding, were openly suspicious at first, but were won over by the directness of the approach, Mr. Ness reported. Persuaded to attend a dinner given by the Police Department, the young hoodlum chiefs were questioned directly on why they thought their district had a delinquency rate that was three times as high as the remainder of the city.

"The boys said they wanted adequate places to spend their spare time in playing, such as swimming pools, baseball diamonds, tennis courts, and gymnasiums; a little spending money; and some adventure," the speaker said. "We told them we would do all in our power to aid them. Many meetings were held subsequent to the first, and it became a mark of great prestige to be invited to meetings of the gang leaders."

Other measures employed by the Cleveland authorities were the following:

"We used our influence in getting many of the gang leaders jobs in Cleveland industries. About 200 boys were placed, through the influence of the Police Department, in industries throughout the city. Almost without exception they made good."

The boys formed an organization called the "South Side Improvement Club," which secured additional night school and recreational facilities. The Club passed a rule that members keep savings accounts, so they might not be tempted to get spending money by robbery during periods of unemployment.

The gang leaders were persuaded to sponsor Boy Scout troops, which they had previously prevented from being formed. "At present there are six troops in existence in this area."

A camp for young boys was established by the police and the Rotary Club, and a corporation was formed to market goods made individually by the boys.

Five police stations in other delinquency areas of the city were closed and turned over to youth organizations, with a membership of more than 3,000.

Medical and psychiatric assistance was given to delinquent youths whose problems apparently were not caused chiefly by their environment.

Zoning Near the New York World's Fair

Charles U. Powell, the Engineer in charge, has written an interesting article, printed in *Civil Engineering* for February, 1939, on "Rezoning Vicinity of World's Fair Site," reviewing the regulations adopted and the principles underlying them.

Old Pasadena Reservoir a Fire-Truck Repair Shop

WHEN the program of fewer and larger reservoirs began in Pasadena, Calif., in 1936 with the advent of Aqueduct water, the Fire Department took over the old 50 x 100-foot reservoir at 1430 North Raymond Avenue, and converted it into a complete shop for servicing and rebuilding fire-fighting equipment and reconditioning fire hydrants. In 1938 WPA built an attractive new fire station alongside, quite in harmony with the residential district.

Fire Station No. 6 has an alarm room, a dining room, a kitchen, a combination bedroom and living room with in-a-door beds and a large bath and toilet room. The building is all-electric—hot water, cooling, refrigeration, heating, all being provided by electricity from the Municipal Light and Power Department. In the back of the building is a paved badminton court to furnish exercise for the platoon on duty. The two-platoon system is used, with 24 hours on duty and 24 hours off, with two 24-hour shifts off per month in addition and also one extra shift off every three months. The building is Spanish mission architecture of tan stucco with a red tile floor. The equipment consists of a standard Seagrave combination pumper and a Seagrave 750-gallon pumper.

The old reservoir has been roofed over with two arched wood trusses in the back and a flat roof in the front where the ramp rises to street level. The area formerly flooded with good drinking water for the citizens is now filled with a wide variety of equipment for keeping the fire equipment in good condition. Considerable space is also used for the storage of fire-alarm equipment. A separate section is screened off for the tools and parts, with each tool outlined on a board so that there is no doubt of the place where it belongs. The ingenuity of the Master Mechanic is evident everywhere throughout the shop in the novel devices he has made to cut the cost of repairs and make the work easier. A portable steel bench carries the tools for the work and the parts needed, so that they need not be tossed from one side of the truck to the other every time the mechanic moves around; they go back on the shelf and the whole works makes the trip with the mechanic. Three men are employed in the shop, where the Department does all its own repairs.

Additional equipment includes a drill press, and a portable hack-saw with a 45-foot cord, so that the saw may be moved almost anywhere over the floor, a grinder, and a South Bend 15-inch lathe with an 8-foot bed, and a built-in cabinet and drawers for all the dies and parts. The mechanics have made their own welding bench with a tray of semi-circular troughs for the different kinds of welding rods used. Both electric and acetylene welders are used in the shop.

An old water tank from a pumper was cut in halves and mounted on angle-iron legs, and is used as a bin for scrap, which does not accumulate in odd corners and is easily looked over when a piece is needed for repairs. The cleaning tank for parts is mounted on casters and contains the solution for removing all grease and grime from the parts to be worked on. This was made by welding in the shop and is just the right height so that it runs over a set of salvaged gas stove burners for heating the solution when needed. A ½-inch air line is run along the bottoms of the trusses with two old electric cord reels mounted at the ends, containing sash cord attached to the rubber air hose about 8 feet from the end. Thus the hose returns to the upper regions when not in use, but can always be pulled down quickly when needed.

The repair pits are well lighted for the convenience of the mechanics. A hydraulic ram is installed for the setting of hose couplings, operating at 16,000 pounds per square inch. E. F. Coop is Chief of the Fire Department of Pasadena, Calif., and H. A. Cannon, Master Mechanic, is in charge of the Central Repair Shop.

Left—Fire-Truck Repair Shop Remodeled from Reservoir, Pasadena, Calif. Fire Station No. 6 at Right

Problems of Sewage Treatment

As Seen by a Non-Technical Member of a Local Citizens' Committee and Described for the Benefit of Other Committee Members

(Continued from the July issue)

Imhoff Tanks

The construction of an Imhoff tank, named for the German engineer who invented it, is shown on this page. Its exact shape and size depend on the amount of sewage it must handle. For our purposes, think of it as a tank within a tank, the inner tank being the one through which the sewage flows. This inner tank is provided with a slotted bottom through which the solids settle into the outer tank. We will assume that the sewage has gone through a comminutor. As the sewage comes in at one end, it flows slowly through the inner tank, and the solids which are heavier than water sink down through the slots into the bottom of the outer tank, and the liquid flows from the inner tank to the filters or to other places of disposal.

The material in the bottom section is sludge. Note that it is not mixed with air, and the bacteria which purify with oxygen do not reach it. Here the sludge rots down, forming a fixed compound which after treatment cannot rot further, and is quite inoffensive and harmless, something like humus in a compost pile.

The gas which is formed bubbles up through the sludge, strikes the bottom of the inner trough and follows the slopes up into the chambers between the inner and the outer tank. This gas is methane or marsh gas. It will burn and can be drawn off for fuel or allowed to go up a chimney where a flame always burns, where the methane gas is ignited and likewise burned. Usually, it is allowed to escape into the air without any attempt to burn it.

The tank must be cleaned of the dead sludge from time to time, which can be done without putting the tank out of operation. Such a tank can be operated by an intelligent man, though he need not be a chemist. Its action is fairly certain if directions "on the bottle" are followed.

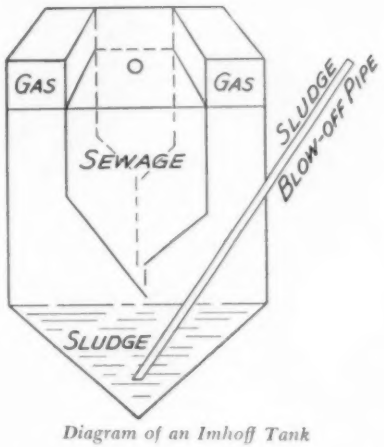


Diagram of an Imhoff Tank

Its one drawback is that in starting a new tank or a thoroughly cleaned tank the digestion may go haywire and become an acid "indigestion." In that event the gas—in this case, carbon dioxide—is formed with such rapidity that the tanks foam and boil and the sludge is brought up and mixed with the liquids instead of being separated from them. The carbon dioxide gas is harmless, but the purpose of the tank is partly defeated. Therefore, when the tanks are cleaned, care should be taken to leave enough of the properly rotting sludge in the tank so that when it is put in operation again the proper digestion of sludge will be continued.

Aeration

Aeration simply means the process of adding air to something. As applied to sewage disposal, it means allowing the sewage to come in contact with air to a greater degree than by simply letting it stand. The purpose of aeration is to allow the purifying action of certain harmless bacteria in the sewage to get in their work assisted by the oxygen in the air.

There are two methods in use: first, to spray the liquid part of the sewage into the air, where it collects the purifying oxygen; second, to force compressed air up through the sewage. The latter method involves the mixture of aerated sludge, full of purifying bacteria, with the raw sewage and aerating for a few hours.

When aeration is at its work, the good bacteria grapple with the bad and with the aid of oxygen destroy the bad bacteria and the organic impurities. Once the process is started, aerated sludge acts on the raw sewage as in the old times risen dough, added to a batch of new dough, started the process in the new lot. Colonies of the good bacteria were thus planted in the new dough, where they proceeded to grow and spread out to "raise" it. Part of this batch was saved to start the next lot in turn. Housewives used to keep a ball of raised bread containing the yeast cells on hand, instead of buying from Fleischmann; and if they lost this leaven, they had to borrow from the neighbors just as they borrowed coals when they lost their fire.

Sewage lends itself to the same system. Once fermentation or action by the good bacteria starts, part of the batch can be dumped in with a new run of raw sewage to start a new batch fermenting more quickly.

In the case of sprayed liquid, however, it is merely necessary to allow the purified liquid to run off, for the bacteria culture remains on the surface of the filter waiting for the next shower-bath to arrive.

Simple Filtration

Here, again, we have what appear to be two sorts of filtration, though they are really one: filtration of liquids through sand, gravel or coarse stone, and the piling of the sludge or more solid sewage on similar beds.

Anyone who has poured water out on a beach knows that it sinks

out of sight. The water itself sinks down between the sand particles and is gone, while the solids cannot get down between the sand particles and are therefore trapped. When the accumulation is sufficient, it can be scraped off and carted away. If there is oil or grease in the mixture as poured onto the sand, it will eventually coat the surface so that water cannot get through, and the surface must either be skimmed off or harrowed to break up the grease coat on the top.

In addition to the simple process of straining out the solids, there is the purifying effect of the bacteria growing in thin films on the sand grains. Air gets into the filter beds as a result of the intermittent application of the sewage, so that the purification is carried on with the help of the oxygen of the air. Some filters, known as trickling filters, are made of coarse stone. In these, there is not as much straining effect as with sand filters, but the bacteria and oxygen are both at work.

Filtration of sludge is not really filtration at all. It simply means running the material on sand beds where the liquids drain off, and these liquids may be said to be filtered as they sink through the sand or gravel of which the filter bed is composed. The sludge after draining and drying is something like partly dried swamp muck.

Putting sludge on filter beds does not treat the sludge in any way. True, in time the material becomes practically harmless. Running the sludge onto sand beds and draining off the liquid simply leaves an area of drying manure, and those experienced in farming can finish the story.

Nowadays most sludge beds are covered with glass, like greenhouses, to help the drying process and to keep odors from spreading.

Activated Sludge

We can now take up the latest and probably the best method of sewage disposal, known as the activated sludge process. Don't let it scare you. We have already covered the elements of this system, but it is an expensive system, and so the engineers must give it an expensive name.

In this system the sewage is divided into liquids and sludge by a settling tank. It is called a primary settling tank. The name is just to make it difficult, but we know that primary merely means "the first," and so this is just the first tank to which the sewage comes.

From the first tank the liquid flows to another tank with porous plates in the bottom, through which compressed air is forced up through the liquid mixed with the aerated sludge returned from still a third tank. This returned sludge brings with it the good bacteria, and the aerating process stirs them into the mixture so thoroughly that these bacteria rapidly destroy the impurities in the sewage.

Once the battle is over, the aerated mixture of sludge and sewage is moved on to a final settling tank, where the sludge settles out, and the now clear liquid flows away to the stream or ocean.

Now here is where the ten-dollar word comes in. Sludge from this tank is called "activated sludge" because there is active purification going on, or because it has gone on and there are millions of little colonies of good bacteria just looking for another fight. Part of this "good" sludge goes back to the aeration tank, and a part is pumped to the digestion tanks with the sludge from the primary tanks. Sometimes the sludge is pumped into the first or primary tank, where it is mixed with the raw sewage. Here its action is twofold: first, the little colonies of good bacteria help to gather and settle the sludge; and, second, they attack the bad bacteria at once and start the fermentation even before the aeration tank is reached, as the housewife's leaven starts fermentation when added to the new batch of dough.

Furthermore, as there is an endless assortment of chemicals and bacteria in sewage which might want to start wars of their own, this addition of the good bacteria in fighting-trim starts the fermentation in the proper way.

Once separated, the sludge is sent to a heated storage tank, where the rotting or digestion action is speeded up by the heat. From time to time digested or well-rotted sludge is drawn off to a drainage bed and dried. The dried sludge is removed for use as fill or low-grade fertilizer.

Filters, Intermittent and Otherwise

So far, most of our attention has been devoted to the sludge. We have covered plain drainage, sea disposal, Imhoff tanks and activated sludge, as far as the treatment of sludge is concerned. In each case we have said that the liquid is drawn off for further treatment. Let us now see what that treatment is.

First, there is the sand filter. Such sand beds are largely mechanical in their action. They strain the larger particles from the liquids. The liquids settle into the earth and in some cases disappear; in other cases the liquid is collected after it has gone through the sand and is piped to some stream. The strained-out solids collect until they form a mat on the surface which stops the liquid from passing through; then the filter is allowed to drain and dry and the dried mat is cleaned off. The character of the soil would determine which is best. As already explained, these filters are dosed intermittently to permit air to enter the pores of the sand.

Second, there is the trickling filter of stone. This is a huge reservoir-like structure filled with stone about the size of a large egg. The only purpose here is to provide all the surface possible in a small area. In such a filter with a large surface area, the biological action of good bacteria on bad bacteria has a large field of operation.

In the case of the trickling filter, the liquid is sprayed over the surface so that while passing through the air it can collect plenty of oxygen and carry it down onto the stones. The good bacteria promptly start to work, and we might say the bodies of the fallen enemies soon cover the stones with a slime on which the good bacteria live and do their work. This slime of course grows thicker and thicker until for some unknown reason it peels off the rocks and is washed into the bottom of the filter. The effect is that of a man on a hayrick that is being loaded. He can get just so much under him and then the load slides off.

This cleaning of the stones is automatic and a new coating soon forms. The oldest filter of this kind in America, at Reading, Pa., in use since 1908, has never had the filter material removed and cleaned.

We can see now that the great difference between a sand filter and a stone filter is that the stone filter is self-cleaning, whereas the sand filter has to have its surface cleaned frequently. The word intermittent comes into the picture in two ways. Some plants alternate from one filter to another to give the bacteria time to work, while other systems spray for a few minutes and then wait for a few minutes, for the same reason. The bacteria need oxygen. They do not work quite so well if there is not much oxygen in the water.

Treatments—Pro and Con

Perhaps this is the place to take up the advantages of the different systems and types of treatment. First, we should divide the sea-disposal system from the land-disposal system, remembering that even with the sea-disposal system some treatment can, and sometimes should, be given on land before pumping out to sea.

First, *sea disposal* by plain gravity or by pumping, with no land treatment:

Disadvantage—Usually, high cost of construction on account of underwater work.

Advantage—Usually, low cost of operation once installed.

Second, *Imhoff tank system,* with or without prior settling:

Disadvantage—This tank sometimes goes wrong and produces an acid fermentation with violent foaming and mixing of sludge and liquids.

Advantage — Once operating properly, if not cleaned too thoroughly, the tank will produce a settled sewage and a humus-like, unobjectionable sludge, and can be operated by anyone who will follow instructions.

Third, *settling in tanks and filtration through sand or stone:*

Disadvantage—Flies which breed in the filters, particularly stone filters: small flies, halfway between a fruit-fly and a house-fly in size. They do not bite, but get in your mouth, eyes and nose. They can carry disease. Sand filters require a large area and expose a good deal of sewage to the sight and smell of people in the neighborhood.

Advantage—Comparatively foolproof. All that is needed is a man with a shovel, and an occasional check-up by the city engineer.

Fourth, *activated sludge* with filter treatment to follow:

Disadvantage—Requires trained operators in mechanics, chemistry, biology, more machinery, pumps, tanks, etc.

Advantage—The system is very flexible. By adjusting the temperature, amount of air added, length of time in treatment, amount of sludge returned to primary tank, the resulting output can be varied. For example, sewage does not need as much treatment in winter as in summer. Sewage itself may vary, depending on whether mills are operating, etc. Advantage can be taken of all chances to reduce expense. Requires a small area.

Fifth, *comminutor:*

While this is part of a system rather than a system in itself, it is mentioned here because it seems to have no disadvantages, is comparatively cheap to install and operate, and is generally a benefit to whatever system of treatment is used.

(*To be concluded in the September issue*)

Niagara Falls Supersedes Automatic Fire-Alarm

Manual System Four Times as Fast

IN 1921 the National Board of Fire Underwriters recommended for Niagara Falls, N. Y., the installation of a Class A manual fire alarm with an isolated headquarters building and repeated the recommendation in 1930. In 1937 a fireproof building was erected in Hyde Park, and the city is now cutting over its 26-year-old Gamewell automatic fire-alarm central station to a Gamewell manually operated central station which is about four times as fast.

The system comprises 12 circuits of 18 or 20 boxes each, and ultimately there will be 20 circuits. In all, there are now 258 boxes, including 30 Three-Fold boxes installed since 1936, and 630 phantom box locations. In 1938 there were 632 alarms, 202 by box.

When a box is pulled, headquarters receives a visible signal by a red light on the circuit panel and an audible signal by the tapping of a bell, and a permanent record is automatically established by a register and automatic time stamp. The operator then sends the alarm to the fire stations by means of a manual transmitter. Two rounds are sent over the primary alarm circuit to all companies, this being permanently recorded on a paper tape by a register in each fire house. Immediately following the transmission of the alarm over the primary circuit, the alarm is automatically transferred to the secondary alarm circuit, and the number is again received by all companies on a large gong in each fire station. The duplicate alarm circuits provide the required margin of safety for the transmission of alarms.

Automatic recording devices are provided for both box circuits and alarm circuits, and record separately the time at which alarms are received in the central station and the time at which they are repeated to the fire stations. Provision is made in the central station equipment to speed up fire-alarm transmission to the utmost and at the same time guard against error. Should a box number be incorrectly set on the manual transmitter, the operator may restore the transmitter to normal position by simply pressing a button, and reset the number by turning a knob for each figure comprised in a box number. Other facilities available for sending alarms to fire stations include a manually operated telegraph and telephone circuit. Power for operating the system is supplied by an individual set of storage batteries for each circuit, maintained at all times in a fully charged condition by a trickle charge. When the project is completed, 85 per cent of the fire-alarm circuits will have been placed underground.

A Postindex visible card system shows all box locations and the companies that respond to an alarm from each box. The reverse side of the card gives a seven-year record of inspections.

ADIN W. CHASE,
City Electrician, Niagara Falls, N. Y.

Utica, N. Y., Takes Annual Blanket Bid on Asphaltic Concrete and Asphalt Binder

Street Repair Costs

Maintained at Low Figure

By Guy C. DeWitt
Assistant Engineer,
Department of Engineering,
Utica, N. Y.

A PROVISION in the 1923 charter of Utica, N. Y., relating to pavement repairs states:

"In case the work shall be the ordinary repairs to pavements, including surface and foundation, or to curbs, sidewalks at intersections thereof, catch-basins or other structures, in any street, lane, alley or public place, such work may be done by the commissioner of public works if the expense thereof is not over $500; otherwise such work shall be performed by contract in the manner herein provided for such improvement, and the expense thereof shall be paid from the repair fund included in the budget for such purposes."

In recent years the amount set up in the budget for this work has varied from $15,000 to $20,000. These amounts have been based on the amount of pavement repair deemed necessary at the time the budget is made.

Annual Contracts

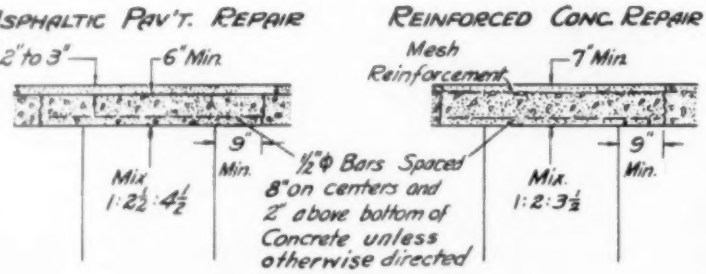
Each year the Common Council directs the Board of Contract and Supply to prepare plans and specifications and advertise for these repairs to pavements. The plans and specifications are prepared by the City Engineer and submitted to the Board. There are three general divisions of work covered by the contract: ordinary repairs to pavements, under the authority of the Commissioner of Public Works and to be paid for from the budget fund; replacement of pavement over sewer, water, gas and other trenches, under the authority of the Commissioner, except that pavement replacement over trenches constructed under other city contracts which are under the authority of the City Engineer; for removal and replacement of pavement and new pavement in connection with cut-back radii, track removal or work of like nature under the authority of the City Engineer, which is paid for from the fund specified by the ordinance directing the work.

The contract for pavement repairs is awarded for a period of one year. The contractor must be prepared at any time, winter months excepted, to proceed with such work as may be ordered. This is more or less of a blanket contract, but it does not prevent the city in any way from having work done by any other contractor or in any other manner or with other materials as the city may require.

The blanket contract pertains particularly to pavements and contains items covering various types of pavements and foundations. Supplementary specifications cover these items as they apply to particular work. A sketch reproduced with this article illustrates the method required for cutting back and reinforcing foundations and pavements across trenches in the city of Utica.

CITY OF UTICA, N. Y.

GENERAL METHOD TO BE USED IN PAVING OVER TRENCHES & EXCAVATIONS MADE IN PAVED STREETS.
1939



Before and prior to placing any new concrete the compacted subgrade shall be dampened and the exposed edges of existing concrete shall be thoroughly wetted.

All work done and materials used shall conform to the specifications and requirements of General Specifications, Standards of Materials and Construction Items for Public Improvements in the City of Utica as adopted by Ordinances of the Common Council dated 1938

Where the replacement is in Reinforced Concrete Pavement or foundation, the reinforcement shall not be cut off, but shall be left projecting in order that it may be lapped with the new reinforcement used in the replacement.

Whenever a temporary surface of concrete is placed on a repair made in an asphaltic type of pavement such temporary surface shall be so separated from the base that its removal can be accomplished in the same manner as removal of asphaltic surface.

Costs

Prices have not changed materially during the past five years. The price bid for asphaltic concrete pavement has averaged 88 cents per square yard exclusive of removal at 18 cents per square yard. Asphalt binder is bid at $6.60 per ton. The prices bid for pavement removal and replacement include trimming the edges of the surrounding pavement to nearly vertical, clean, straight edges, and the painting of these edges with hot asphalt prior to the placing of new material. This system of pavement repair has proved quite satisfactory. There has been little delay in the repairs, which naturally must frequently be made at quite widely separated points. The amounts set up for this work have usually been ample to take care of ordinary repairs. The city has 2,500,000 square yards of asphaltic pavement in use. Based on this yardage, the cost of annual normal repair is about $0.008 per square yard.

Conclusion

Prior to 1923, when the repair of pavements by contract became mandatory, the city had used this same method. The city has never owned a hot-mix plant, and it is a question whether these repairs, limited as they are, could be effected any better or at any lower cost than they are under the present system. There is but one plant in the city furnishing hot mixes. The prices bid have always been within reason and compare favorably with prices elsewhere. During the past few years, the average age of asphalt pavement replaced has been 36 years.

Municipal Swimming Pool Has Asphalt Macadam Bottom

THE borough of Kutztown, Pa., decided to employ relief handlabor to construct a swimming pool having an asphalt macadam bottom built by the penetration method. Approximately 220 feet by 450 feet in size and holding 2,500,000 gallons of water, this pool cost $12,000 to build, in 1931.

The pool is located on the side of a hill. As the initial step in its construction, therefore, the gravel-clay soil was cut from the uphill side and moved to the downhill side to form a dyke. A concrete dam built across the deep outlet end facilitates the cleaning of the pool and serves to hold the draining equipment. The depth of the water varies from zero to a maximum of 9½ feet.

After grading and compacting the subgrade, it was covered with 4 to 6 inches of 1-inch stone, extending up over the slope and brim of the pool to a distance 10 to 15 feet back from the water's edge. Texaco asphalt cement having a penetration of 90 to 100 then was applied to the stone by means of a pressure distributor truck, except where the slope was too steep, making it necessary to resort to hand-hosing. In places where the hot asphalt was found to be running down through the stone, water was sprayed on to cool and harden it more rapidly.

Rolling was accomplished by means of a 10-ton three-wheel roller, a 6-ton tandem, and a hand-roller on the steep slopes. The procedure throughout was similar to asphalt macadam highway construction using the penetration method, and the results have been entirely satisfactory. No maintenance has been necessary up to the present time. It is suggested, however, that for the final application of asphalt, a harder grade, perhaps 60 to 70 penetration, be used and covered with fine chips or coarse sharp sand.

About 2,200 people may be accommodated very comfortably at one time by the Kutztown pool, peak days totaling as many as 6,000 guests. It has become a very popular recreation spot for the eastern part of Berks County.

Spring water is piped 1,000 feet through a 6-inch pipe line to feed the pool, a constant flow being maintained by continuous drain through the dam breast. Around the edge of the pool, a beach has been provided by spreading 2 inches of white sand from the water back for 10 to 15 feet. Application of the asphalt was performed by the Windsor Service Co., of Reading, Pa.

The Municipal Swimming Pool in Kutztown, Pa.

Restoring Water-Main Capacity

Inexpensive Method Used Successfully in California Made Possible Through Close Chemical Control

By ARTHUR TAYLOR

M. Am. Soc. C. E.
Taylor & Taylor,
Consulting Engineers,
Los Angeles, Calif.

THROUGHOUT the country, Old Man Corrosion collects a terrific toll in loss of flow capacity of steel and iron water mains, along with that more measurable shortening of life resulting from the gradual dissolving away of metal.

Above-ground metal is usually painted at necessary intervals in order to stop corrosion, thereby virtually perpetuating its life, as attested by century-old wrought iron bridges in Europe that look like new today. Buried metallic structures, excepting cast iron pipe lines, usually are provided with some sort of coating, wrapping, or encasement to protect the life of the metal from corrosive attack by chemical solutions in the soil.

Protection against corrosion of the inside of metallic water conductors has been attempted, but not with the same zeal as in outside protection. Of late years a great deal more attention has been directed towards preserving the original interior condition of new metallic pipe lines, not only for prolongation of useful life, but for maintaining the original flow capacities as well—a matter of great economic importance in waterworks practice. Even the makers of cast iron pipe have become cognizant of the trend towards buying pipe for its sustaining flow capacity, and now turn out a great deal of their product with cement or some form of enamel lining.

Many of the inexpensive and so-called interior protective treatments have been short-lived indeed. Frequently, in only a few years the pipe becomes pitted and highly spotted with tubercles, the sponge-like bumps of the oxides of the iron; in other words, rust-bumps. Underneath each bump of rust is a pit in the metal shell from where the oxide came. These bumps and pits affect the velocity of the water by friction; the more and higher the bumps, and the more and deeper the pits, the more the velocity is retarded, or else more energy is required to force the same voluume of water through the pipe line. In time, as the tubercles grow, the inside area of the pipe decreases. As the flow capacity of a pipe line is the direct product of the velocity times the area, naturally, when the velocity is retarded owing to increased frictional resistance the capacity, the product of the two factors, is smaller.

Water flows downhill by gravity, and it flows uphill in a pressure conduit when pumped with an equal amount of energy, together with that additional amount necessary to overcome the frictional resistance caused by the interior condition of the pipe. The rougher the inside of the conductor, the more the friction, and, consequently, the less velocity and capacity. Research of engineers has resulted in establishing coefficients which apply to pipe of various degrees of interior roughness. Among the researchers, Williams and Hazen have determined coefficients ranging down from 150 for very smooth surface to 40 for very rough, tubercled surface. Both such pipe lines are found in operation throughout the country, and—astonishing as it may sound—the former has a capacity of 3.75 times the other, when the same amount of water is pumped with the same amount of energy. These are extreme cases, for the water main of 150 coefficient is of special, more expensive pipe; though well-smoothed reinforced concrete pipe, cement lining or unbroken coal-tar enamel lining in ferrous metal pipes usually shows by tests a coefficient of 140; while pipe of coefficient as low as 40 is found only in old pipe lines where water is extremely corrosive or there may be organic growths.

Naturally, it is not practical to replace all existing water mains of low flow coefficient, but modern science affords practical means of restoring capacities to the original figures and to maintain them aganist retuberculation by correcting the chemical constituents of the water to render it non-corrosive to steel and cast iron.

Restoring Pipe Capacity

Both acid and alkaline waters found in nature corrode metal, but water brought to a certain chemical proportioning of non-harmful constituents reaches a point where it neither corrodes nor deposits. The application of this principle on municipal water supplies is both practical and relatively inexpensive—many-fold less than the benefits accruing to the distribution system. In applying this principle it is also practical to slowly "dissolve" existing tuberculation and organic growths, thus restoring the original flow capacity of mains, and then when cleaned to gradually apply through deposition a thin protective "whitewash" coating of calcium carbonate (limestone) on the inside of the mains.

For the water works that has a filtration or softening plant, only minor additional chemical feeding equipment and control is necessary. The operation is done by "water conditioning" through chemical means to bring the water supply to a certain relationship between acid intensity and alkalinity, and maintaining it so that it neither builds up nor dissolves out the already deposited calcium carbonate coating.

Sixteen years ago when the city of Beverly Hills took over a utility company, flow tests indicated a Williams and Hazen coefficient as low as 60 in many miles of pipe lines. These reduced capacities in a fast-growing community indicate a serious need of replacement of much of the distribution system or else a restoration of the pipe lines to full flow capacity.

As treated water was fed into the

distribution system, the tuberculation gradually "melted" out owing to the changed water condition. Sterilization by use of chlorine was applied in strengths as high as possible without being objectionable to domestic consumers. This ended the algae growths the presence of which with the iron rusts formed tubercles, while the small amount of calcium carbonate which was permitted to be carried over in the water from the treatment plant to the distribution system partly reacted with the ferrous compounds to break them down gradually, following which the suspended limestone slowly deposited on the pipe shell, building up a thin "whitewash" coating. In time that deposition was prevented by cutting off the supply of calcium carbonate in the treated water supply.

"After-depositing," as it is called, which results from the lime-softening process, for years was the curse of this cheapest method of water softening. Not until some wise water-works chemist stumbled upon the idea of applying a minute amount of acid to the lime-softened water, was that method of softening really satisfactory.

As carbon dioxide is harmless and the most inexpensive of the mild acids, its use as the reagent on the non-precipitated calcium carbonate is now practically universal in water-works softening plants which use lime as the softening medium.

So in the case of Beverly Hills, when the mains had been neatly lime-coated, carbon dioxide gas was applied to the treated water to stop further "after-depositing." The amount applied can regulate the build-up or the re-dissolving in case the deposit gets too thick.

Application in Other Cities

Water systems without softening and filtration plants can restore their mains to original flow capacity by a modified procedure which would necessitate means of conditioning and maintaining the water supply to a chemical state wherein the water is both non-corrosive and sterile against organic growths on the inside of the pipe lines. The facilities for so doing are: chemical-feed equipment, mixing basin of moderate retention capacity, and proper laboratory control to determine the best methods and chemical proportioning. The cost of these facilities is modest in comparison with the savings in replacements with larger-capacity mains and in pumping costs.

The Trailer—Business Builder and Civic Problem

Sidelights of Industry, the bulletin of the American Petroleum Institute, in its June 25 issue, discussing "Business Builders," says:

"Depression-proof business builders are the 'tin can tourists' who boosted America's trailer population almost into the six-digit class in 1938 and sent a steady stream of dollars into the cash drawers of business in every section of the country. Their numbers will far exceed a million in 1939, according to late reports.

"'Trailing' is a unique branch of the tourist business, for it experienced its greatest growth during the depression years. Early in 1937 there were about 150,000 coach trailers. By the end of 1938, nearly 300,000 trailers were rolling over the highways. More than half of them were built by regular manfacturers. Home-built jobs accounted for the balance. Averaging three persons to each trailer, modern nomads number around 850,000.

"Growing appreciation of the value of trailer dollars can be seen in the improved facilities provided for trailer use. Outstanding are the Tampa, Florida, camping grounds, and Trailertown, built for visitors to the New York World's Fair."

This growth of the "tin-can tourists" business suggests renewed consideration by municipal officials and planning commissions of the problem of regulating house trailers and camps. One major aspect of the situation is that public and private camps in which trailers may park are, for the most part, inadequately equipped with plumbing and electricity. This has increased a need for more stringent regulation and control, and many cities are responding by tightening their local ordinances. In this connection the American Society of Planning Officials reports:

"Among the many cities which have enacted new trailer ordinances this year are Dayton, Ohio, New York City, White Plains, N. Y., Tulsa, Cincinnati, Memphis and Arlington County (Washington, D. C., suburb) Va. Under these ordinances trailer operators must comply with health and sanitary regulations and, in many cases, with zoning laws. In some instances the time a trailer may stay in a city is limited.

"Dayton's comprehensive trailer ordinance was passed in February. Trailers must be parked in restricted zones and must comply with city health and sanitary restrictions, and refuse- and sewage-disposal requirements. Trailers may not stay in the city for longer than one month except in certain specified areas.

"The New York City and White Plains ordinances were enacted in anticipation of World's Fair trailer visitors. The New York City law, an amendment to the administrative code, requires full compliance with the sanitary code and makes it unlawful to park a trailer on a vacant lot unless written permission from the owner or manager is obtained.

"White Plains' law is designed to prevent encroachment of trailer camps on residential districts. In a recent case in which a property owner rented trailer space in his front yard, thereby violating a zoning statute, White Plains officials ordered the owner to remove the trailer or pay a fine. City officials said that a trailer camp could not be considered an accessory use in a residential district, and that it was contrary to the purpose and spirit of the zoning ordinance.

"Sauk City, Wis., prohibits the parking of trailers within the city for more than 20 days without a permit, which will be issued only after the trailer has been connected with sewer, water and electrical systems, and the owner has complied with the city's sanitary code."

The Massachusetts State Planning Board has made a special study of the trailer problem in that state. The report analyzes the situation:

"Does the state, or do the cities and towns therein, wish to encourage trailerites because of their potential business and advertising advantages, and make provision for an orderly and convenient operation of facilities? Or shall this influx of visitors be discouraged because of the possible resultant congestion of traffic arteries and added costs of community services?"

The report concludes:

". . . a steady flow of trailerites is to be expected and encouraged and their visits should be made a source of pleasure and profit to all concerned. It is recommended that Massachusetts be prepared to stem any possibility of 'trailerite slum' growths and yet not stifle the healthy development of trailer homes, which, after all, affords one step towards a partial solution of the low-cost housing problem."

The report recommends that Massachusetts should provide in advance for a possible influx of these houses-on-wheels, by the enactment of regulatory sanitary, housing and health legislation, and by the construction of properly controlled and equipped trailer camps. See page 111 for listing of this publication.

EDITORIAL NOTE.—The recommendations of the National Fire Protection Association's Committee on City Planning and Zoning as to regulating house trailers and camps were published in THE AMERICAN CITY for August, 1938. At the Association's annual meeting in May, 1939, some minor changes were adopted in these recommended regulations. H. C. Klein is Chairman of the Committee, with offices at 90 John Street, New York. (See also p. 107 regarding regulation in Detroit.)

Going to Blazes in Small Towns

By Henry F. Buchholz
Milburn, N. J., Fire Department

In some municipalities police departments receive the fire calls and transmit the alarms. In many cases the police officer will only send out one piece of apparatus. When it arrives, the fire may be such that additional help is required and it is necessary to transmit a box alarm.

If your municipality has a part-paid fire department, have the calls received and transmitted at fire headquarters, where the man on duty knows what to send.

Make an Adequate Response to a Call

Calls for refrigerator leaks should be carefully handled. Sending one man in a pleasure car is bad practice. Refrigerator leaks are dangerous, and a well-trained company should answer the call. If the department has no emergency or rescue squad, an engine and a truck should respond to a call from an apartment house or business establishment. If at night, tenants have to be aroused and removed from the building, and it may be necessary to use an inhalator. A call to a one-family dwelling can be answered by a truck company. The place, if entered by men wearing gas masks, must be thoroughly ventilated.

A number of calls are received by fire departments because of an unusual amount of smoke in cellar or building. Here again, small departments make a bad mistake when instead of transmitting an alarm, they send one or two men to investigate. Only recently a city department lost two men at a small cellar fire, because of failure to wear gas masks. Smoke may contain a number of poisonous gases. Don't gamble; transmit an alarm for unusual smoke.

Send Apparatus

Have apparatus and equipment on hand ready to use if needed. Protect your men and property. If all the apparatus is not required after the situation has been sized up, some can be sent back to their respective quarters. Why be afraid to send apparatus? Taxpayers pay for this protection and should receive it. Apparatus and equipment are of no avail in quarters.

A telephone alarm received from an excited person reporting trouble and then asking not to send apparatus should always be answered by a first-alarm assignment. People often fail to realize that the first few minutes are the most important to a fire department. In departments where the driver is the only paid man and other members of the company are call men, it is best to wait for enough men to handle the apparatus when it arrives at the fire.

Municipalities should endeavor to provide one full-paid company. This company would respond immediately, and other apparatus answering the alarm could be manned by paid and call men.

Consolidation of apparatus in one station has proved in a great many cases to be of no value. As was said in this magazine some time ago, "Coming out of this station, the apparatus must turn either to the left or to the right, in either event giving the resemblance of a parade, and if one of the forward pieces should break down, the following pieces stand the chance of being blocked." Stations should be placed in different sections of the town so that all buildings and property come within the 1½-mile zone from the fire station. This will give the taxpayer proper protection, according to the National Board of Fire Underwriters—and consequently a lower fire insurance rate.

Kentucky County Debt Act Sustained

Early in 1938 the General Assembly of Kentucky passed legislation strengthening the County Budget Act and providing machinery whereby the state local finance officer (the Commissioner of Revenue or his appointee), with the collaboration and approval of an ex officio county debt commission, might directly assist counties in planning their long-term financing or refinancing programs.

Pursuant to this legislation, the local finance officer assisted certain counties in negotiating funding plans for the handling of certain judgments and other indebtedness; and, incident to approval of these plans, certain taxpayers and local officials attacked the constitutionality of the statute. The principal objections, as stated by the Court in its opinion, were formulated in the following questions:

1. Does the 2 per cent limitation in Section 158 apply where a proposed bond issue is to fund a debt which is in the form of a judgment, and which judgment has never been appealed, and where the appeal from such judgment is now barred by the statutes of limitation?

2. Is the Act unconstitutional because it forbids the county to incur an indebtedness in excess of ½ of 1 per cent of the taxable property without the approval of the County Debt Commission, when Section 158 permits a county to incur an indebtedness not exceeding 2 per cent of its taxable property?

3. Has the Legislature usurped the powers of the fiscal court and thereby contravened Section 144 of the constitution?

4. Is the notice to the county judge of the hearing sufficient notice to the taxpayers of the county?

5. Does the Act give the county debt commission judicial powers when it allows it to pass upon the validity of bond issues, and in providing its findings of fact shall be final if supported by any substantial evidence, and in providing where there is no appeal, the decision of the Commission shall be "res adjudicata"?

Although the Circuit Court which originally tried the case had found the statute completely unconstitutional and invalid, the Court of Appeals, the Supreme Court of Kentucky, reversed the Circuit Court on every count, and held that the statute was entirely constitutional in all of these several respects. It is gratifying to friends of good government that the Court incidentally showed clearly its approval of the admirable policy of state technical assistance to localities involved in the legislation. In connection with this case the entire Court sat, and the opinion by Judge Sims was unanimously approved.

James W. Martin,
University of Kentucky.

Repairing City Refuse Trucks

(*Continued from page 48*)

pit the truck is washed and the body wiped down with chamois. The truck is then rolled ahead to the second pit, which has a clear space of 9 feet between it and the first, and the truck is given the proper lubrication in accordance with the chart.

Paint Shop.—An air spray gun is used for painting bodies and other objects. Aluminum paint is used on can-collection trucks, and black enamel on garbage truck bodies and chassis. Older laborers who may have been injured and are not eligible for pension are used in this shop because the labor is light.

The Trucks Themselves

In the yard each truck has its own stall. As it is driven in in the afternoon it is taken to the gas attendant, and the tank is filled so that it is ready for work the first thing in the morning. During the night a man in the yard checks the tires and replenishes the oil as needed, and adds water to the radiator when required. If the truck is due for its lubrication service that night, a man from the lubrication shed gets it and returns it when the service is complete.

There has been a constant program in Los Angeles to improve the types of collection bodies for the garbage trucks for the particular conditions under which they are used in Los Angeles. This has led to a constant re-designing of the bodies and prompt junking and sale of obsolete types. The present standard is a body built of 12-gage metal 144 inches long, 84 inches wide, with the sides 20 inches high. The sides have lifting bails welded on so that the bodies may be lifted quickly at the transfer stations by an electric crane. Down the center of each body is a partition the same height as the sides, with the top rolled over for stiffening. These aid greatly in improving the strength of the entire body under its unusual handling conditions. The bodies are not fastened to the chassis but merely rest on them with a bumper of old fire hose on the 1-inch wood sill to absorb the shock when they are replaced by the crane and while traveling to and from collection routes. Lugs on the bottom prevent the bodies from sliding back or laterally.

Each truck is equipped with a portable folding step which may be placed on either side of the truck and forward or aft. Collections are made on the left side of the street as required on residence streets, under great care in operation, but the trucks always double back when operating on business streets so as to collect on the right side.

Each truck has a wire screen at the back of the cab window to protect it when the body is being removed or replaced by the crane. The loads are covered with canvas as soon as completed. The capacity of the old heavy trucks was 6½ cubic yards, and the newer Ford and Chevrolet trucks carry 6¾ yards with the much lighter bodies in use.

Diagonal stripes of black and white are painted on the ends of all the tanks, and in addition those which operate at night have red reflectors. The ends of the truck bodies are sloping and rather sharp, and several accidents in which other vehicles ran into them made the engineers decide to put false ends on all trucks. The truck bodies are designed to use standard sheets without waste, and great economy has been effected by letting the contracts for the construction of new bodies in the off season.

What Has Been Saved in Repair Costs

Repair costs to equipment since 1933 have shown an actual decline of 27.1 per cent in spite of an increase of 24.2 per cent in wages for machinists. Wages are the major item in repairs for equipment. A saving has been made by having all crank-case oil reclaimed under contract with the Bureau of Power and Light.

According to H. P. Cortelyou, Deputy Engineer in charge of refuse collection, if the methods of collection used in 1933 were still in use, the Division would require 58 per cent more personnel, or an increase of $412,000 annually for wages. Further, if the types of trucks and bodies and repair methods were the same now as in 1933, the operating cost, including depreciation at 70,000 miles, would be 10.27 cents per mile instead of the present 6.12 cents, and annual truck costs would be $84,000 higher. This speaks its own piece in favor of preventive maintenance in city equipment, and for the selection and design of equipment to fit the particular service in which it is to be placed. J. R. Taylor is Superintendent of Refuse Collection in Los Angeles, and Lloyd Aldrich is City Engineer.

T. R. K.—914

One of the Latest Model Garbage Trucks Used by Los Angeles, Calif., Showing the Welded Bails for Removing the Body, the Portable Folding Step, and the Diagonal Warning Stripes at the Back

Division of State and Local Government Designated by Director of the Census

THE Division of the Bureau of the Census which compiles and publishes data on state and local government finances and activities has been appropriately renamed the Division of State and Local Government, effective July 1, 1939, according to an announcement made by Director William L. Austin of the Bureau of the Census, Department of Commerce.

Changes in the names previously used for the Division and its officers have occurred informally from time to time as the scope of the Division's work has changed. The Division was separately organized in 1912 as the "Division of Statistics of Cities," in charge of a "Chief Statistician for Finance and Municipal Statistics." Later names have included "Financial Statistics of Cities," "Financial Statistics of States and Cities," "Statistics of States and Cities," and "States and Cities." The new designation, "Division of State and Local Government," indicates the present scope of the statistical duties of the Division, and is comparable to names of other Census units, such as Division of Population, Division of Manufactures, Division of Agriculture, etc.

The decennial canvass, now called "Financial Statistics of State and Local Governments," originated in 1850, with the report on "Social Statistics." In 1880, two separate decennial reports in this field were authorized, viz., "Wealth, Debt, and Taxation," and "Social Statistics of Cities." The last of these decennial canvasses was in 1932, and plans are now being made for the 1942 survey, which will cover the more than 180,000 units of government in the United States. The Bureau of the Census was authorized, upon the creation of the Department of Commerce and Labor in 1903, to continue the annual "Statistics of Cities Having a Population of Over 30,000," which has been compiled by the Bureau of Labor since 1898. Since 1932, this city series has been confined to financial statistics and has covered only cities having over 100,000 population, but a restitution to its former coverage is expected to be authorized shortly. Financial data for counties including within their boundaries a city of over 300,000 population have been compiled since 1907. Annual "Financial Statistics of States" were added to the Division's work in 1915, and after a temporary elimination in 1933 were restored beginning with 1937 reports.

Illustrative of the other types of information compiled at present by the Division are data on public employment and payrolls of states, cities, and counties; summaries of state tax legislation; and propositions voted upon in state and city elections. A Municipal Reference Service has been established to maintain state and local government documents and other sources of governmental information for the Division, and to answer inquiries in this field by correspondence or by the loan of documentary material to Federal, state, and municipal officials and researchers.

Underground Structures

(*Continued from page 55*)

ning of the year as to contemplated construction. The charter provides that three times the value of paving repairs may be charged for cuts during the first year of installation, two times the value for the second year, and normal cost thereafter.

Summary

This subject is of so general a nature that no specific plan applicable to all conditions can be laid down in the field in design. There are certain generalizations, however, which are applicable to design. Past procedures, without centralized control of planning, that have led to chaotic underground conditions, can be remedied by establishing a centralized agency to deal with underground conditions as they exist, and may exist in the future, to the best of that agency's ability, and the agency must maintain control of the carrying-out of its direction. Furthermore, the development of an underground map of street conditions is a necessary point of beginning in the problem of allocating space for underground structures.

ACKNOWLEDGMENT.—From a paper presented at the Public Works Congress, New York City.

Hollywood, Fla., Water Works

(*Continued from page 43*)

immediate reduction of fire-insurance rates in some sections by about 10 per cent. Another result, which had not been anticipated in its entirety, was a reduction of water pumped of about 15 per cent, due to stoppages of distribution leaks. The income from the sale of water has increased about 10 per cent, which has been accompanied by increased good-will on the part of consumers because of the uniform pressure and greatly improved quality of the water. The reconstructed plant has been in full operation for about seven months, and there is no doubt that the use of sea water for regenerating zeolite softeners is a success as practiced at Hollywood, Fla.

Dearborn Subdivision

(*Continued from page 36*)

have a minimum width of 50 feet at the building line and an average depth of 120 feet. The restrictions of the tract provide for a close control by the Foundation of the architectural treatment of the entire development, in order that the types of homes and locations of buildings may conform to the general layout and topography of the area of the subdivision.

The Ford Foundation was organized in 1936 as a non-profit, public welfare corporation, for scientific, educational and charitable purposes.

Forward Steps

Reported by Municipal Officials, Chamber of Commerce Executives, and Others

Beaver Dam's Hard-Won Parking Area

BEAVER DAM, WIS.—As a result of several years of hard work on the part of the City Planning Commission, which was created by the Mayor following a Chamber of Commerce meeting held the latter part of 1929, Beaver Dam has a spacious downtown parking area, located just off the two main business streets of the city. It is three blocks long, and is divided into two parts by a railroad trestle.

The original purchase of land was made from the old Woolen Mills. At first there was no money available for this project, so to make a start four owners of property immediately adjoining the area bought certain small bits of land just back of their stores, at rather high prices, and this money was used to get the project under way.

With WPA aid, the course of the river was changed, it was dredged out, and a large retaining wall was put in on both sides as far as the railroad trestle. At this point the money gave out, but the Mayor provided city funds with which to finish the wall from the trestle to the lower end of the area. That spring all the débris collected in the annual spring clean-up was used to fill in the marsh, and the good earth which had been dredged from the river was thrown over on this débris to cover it.

One of the former local factory owners hired a prominent Green Lake, Wis., landscape architect to landscape the space, and paid the entire cost of these services as well as of the material used. This citizen and another local manufacturer also donated $1,000 in cash.

Grass was sown along one side of the river, with the idea of inviting the farmers to eat their lunches there and allow their children to rest or play in the shade. The very pretty modern comfort station came two years later. Poplar trees were used as a screen for all unsightly back yards adjoining the area, and all the way down to the lower end of the area along both sides of the river as well. The new water tower is located in this area. Most of the work has been completed during the past two years, and improvement is

(The views on this page were taken before and after the improvements.)

Reptile Garden in the Mohawk Zoo, Tulsa, Okla.

carried on each year.

The significant thing is that this beautiful parking area was finally finished after having been fought bitterly by the Mayor, the Council, and merchants whose stores do not adjoin the area, from the very moment it was started until it was completed. One mayor claimed that it was the worst deal the city had ever made. The Planning Commission was criticized for using space for grass which might have been utilized for parking; and there were numerous other obstacles. However, I believe everyone now agrees that we have a parking area which many larger cities would be proud to own.

BEULAH M. CLOUGH,
Secretary, Chamber of Commerce.

Former Race-Track Becomes Circular Boulevard

CORONA, CALIF.—When this community ended its annual three-day Spring Fiesta May 7 with the dedication of a new landing field, the final step in the progression from horse to automobile to airplane was taken by the city that was built in and around a race track.

The pioneer Early Californians whose ranches covered the alluvial fan that is now Corona loved horses, and laid out the three-mile circular track for friendly brushes among neighbors. Then came the automobile. The track, with few changes, became a popular setting for the road races of the period from 1913 to 1916. Many famous old-time drivers roared 'round and 'round for a hundred laps or more. The first race, in 1913, attracted 60,000 spectators, and the average speed, incidentally, was only 75 miles an hour.

For a few short years the races held the center of the stage at Corona, but all the time the city, which had been incorporated in 1906, was growing up. By 1916, when "Wild Bob" Burman blew a tire in the 97th lap, killing his mechanic and a track guard, the city had been built up to a point where continuance of the races was hazardous and the process of transforming the track into a wide circular boulevard was begun.

Today the "perfect circle" is an attractive avenue surrounding the business district and lined by homes. Corona's population has climbed to 8,300. The city is credited with being the lemon capital of the citrus belt, and has a $1,500,000 annual payroll. The Chamber of Commerce speaks proudly of the "famous three-mile circular boulevard, bordered now by stately mansions and deep shade of mature trees and paying perpetual tribute to the vision of pioneer planners."

The race-track days are slipping into history, but the "perfect circle" remains indelibly outlined on the city's map.

C. K. PRIEST,
Balboa, Calif.

The Reptile Garden in Tulsa's Zoo

TULSA, OKLA.—This reptile garden, housing 50 snakes, 12 alligators and 13 turtles at Tulsa's Mohawk zoo, is the only one of its kind in the United States, says Zoo Director Hugh Davis.

The total cost of the project, just completed, by WPA, was $10,481.71, including only $1,000 in materials as the City Park Department's expenditure. The garden was built of rock which was hauled five miles to the park, and is surrounded by a metal fence.

The snake haven was built at a cost of slightly more than $135 per reptile, not bad for a creature that started life in a hole in the ground.

THEODORE A. EDIGER.

The Prospective "Venice of America"

SAN ANTONIO, TEXAS.—Plans to convert San Antonio into the "Venice of America" are rapidly nearing completion, according to Jack White, chairman of the property owner's advisory board on beautification of the San Antonio River. The river, which winds through the heart of San Antonio's business district, will be converted into a playground for residents of the city and visitors, with funds from a $75,000 bond issue, augmented by WPA funds and labor to make a total of some $300,000.

4TH AIR BASE PHOTOGRAPHIC LABORATORY

Corona, Calif., the City That Was Built in and Around a Race-Track

The bond issue, which will place a tax only on property within two blocks of the river, was passed on October 25, 1938, with but one dissenting vote. As soon as city engineers approve the plans, WPA authorities are expected to make funds available for the project.

By constructing walks, stairways and walls, planting vines, flowers and shrubs, building fountains, an outdoor theater and boat landings—the river will be converted into a beautiful "street." Then will come the boats, the flower vendors, the musicians. And there will be in the shadow of the city's skyscrapers a beauty-spot and a playground where residents and visitors will delight to linger.

Beautification of the San Antonio River is a project that was discussed for many years. It was long ago agreed by clubs, firms and individuals that something should be done to capitalize on the river, yet no one did anything about it. But during the annual San Jacinto Fiesta Week celebration in the spring of 1936, the Plaza Hotel, operated by Mr. White, planned and carried out a Venetian Night carnival beside the hotel, to show San Antonio what could be done with the river. The festival brought the city nation-wide publicity in newspapers, magazines and news reels, and it was felt that, after this demonstration, some group would undertake the beautification plan. But still no sponsorship appeared.

And so, in January of last year, Mr. White decided that a project that meant so much to the city could no longer be neglected. He began calling on property owners whose land fronted on the river; he explained the plan to them and received their endorsement.

With the creation of San Antonio Improvement District No. 15 and the overwhelming success of the bond issue vote, the way is cleared to convert the meandering stream through the downtown section into a street that will make San Antonio famous as "the city where you shop from gondolas."

The advisory board is giving particular thought to encouraging property owners to beautify the buildings fronting the river, with the thought that these back entrances will be changed into beautiful front entrances, more attractive than those facing the street. There will be shops, cafés, a flower market and other businesses appealing to the tourist, so that shopping from a gondola will become a reality.

Excavating the San Antonio River and Preparing a Retaining Wall Back of the City Water Works, in the WPA Beautification Project

Plans call for beautifying the river from the Municipal Auditorium to the Plaza Hotel, a distance of 1¼ miles. An outdoor theater with the stage on one side of the river and seats for the audience on the other will permit the use of water curtains. The river banks will be terraced and sodded. Flowers, vines and shrubs which, owing to favorable climatic conditions in San Antonio, thrive the year around, will be planted. Electrically lighted fountains will be built. To make this playground easily accessible, stairways will be built from each bridge in the downtown area to the water level.

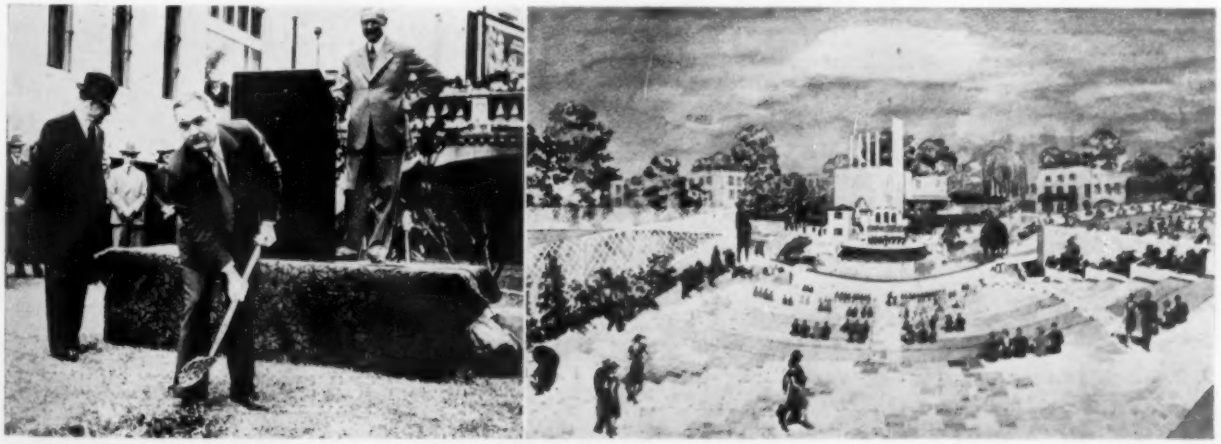
C. K. QUIN,
Former Mayor.

A Dismal Swamp Becomes a Park

BATON ROUGE, LA.—For years the "old Perkins swamp," adjoining the Louisiana State University campus in Baton Rouge and the city park lake, had been an eyesore, a breeding place for mosquitoes, and a detriment to the economic value of the area adjoining. Recently, with the aid of WPA funds, the trees and the underbrush of the old swamp have been cut away, the area filled with water, and the whole pernicious section has been converted into an attractive 285-acre park lake encircled by shaded lake-shore drives, and offering facilities for fishing, sailing and swimming. Homes and residential subdivisions are springing up around the lake shore.

The completion of this improvement marks the end of many years of planning by the University, the Baton Rouge Chamber of Commerce and the East Baton Rouge Parish Police Board, all of which acted as co-sponsors for the project. Many interested private citizens also gave both time and property to the undertaking. The University, which owned 90 acres of the 285-acre tract of land covered by the swamp, deeded this property to the city, and the private citizens who owned the remainder did the same.

The lake is divided into three sections connected together, and also connected with the older city park lake by underground concrete flumes. These maintain the water at equal levels and permit the



Breaking Ground, San Antonio; Mayor C. K. Quin, Jack White, and Walter Napier, President, San Antonio Chamber of Commerce. At Right, Panoramic Sketch of the Open-Air Theater and Stage

THE City of Jackson, Miss., is a typical owner of Adams Heavy-Duty Motor Graders. Their Diesel model does every conceivable kind of street and alley work—general maintenance, scarifying, new construction—and does it on only 1½ gallons of fuel per hour. Above, it is shown building a subgrade for paving on a WPA job. Says the Transportation Supt., "We have another make of grader but like the Adams best because it can do more work in the building of new streets."

Adams Heavy-Duty Motor Graders, with 66½-hp. gasoline or 62½-hp. Diesel engine, will handle the heaviest of street work. For smaller motor graders investigate the popular-priced Adams No. 302 with 45½-hp. engine, or the low-priced Adams No. 20 with 22½-hp. engine (pictured below).

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This No. 20 grades for the Town of Hamburg, N. Y., on only 5 gallons of fuel per 8-hour day. Low in price, economical to operate, any town can afford it.

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Gentlemen: Send me the name of your local representative and catalogs describing your ☐ Heavy-Duty, ☐ Medium-Size, ☐ Small Motor Graders.

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passage of fish from one body to another. The depth of the water varies from 4 to 15 feet, and is controlled by a concrete spillway located on the College Town Road, the elevation of the weir being 22.8 mean gulf level. At one time many drainage canals from the city emptied into the swamp, but with the completion of the project, these have all been re-routed through a new diversion canal built along with the construction work at the lake.

Large-scale in proportion, the project involved the removal of 1,000,000 feet of timber, mostly cypress; the pouring of 1,500 cubic yards of concrete for bridges, flumes and spillways; 105,000 cubic yards of earth excavation for canals, levees, and the Lake Shore Drive; and 4,700 cubic yards of gravel surfacing.

JOHN J. MUNDINGER,
Designer and Supervising Engineer of the Project.

A View of the New Park Lake in Baton Rouge, La.

Modernizing Downtown Shopping Areas

Large and Small Cities Plan to Conserve Property Values

LA GRANGE, ILL.—An aggressive fight against obsolescence in building designs in a business district is being undertaken by the La Grange Plan Commission. Observing that even the best maintenance could not prevent a building from becoming undesirable business property if its architecture was in disfavor, the Commission is endeavoring to develop a harmonious plan for the entire business area based on architectural motifs that have stood the test of time.

To obtain ideas to guide it in selecting the best possible design, the Commission is offering a $100 cash prize for the best sketch submitted. The contest is open to all, and entries must be in the hands of the Commission by noon of November 1. After a winner has been selected, all plans will be used to work out the final plan. Then, whenever an application for a permit for remodeling or for new construction is received, the Commission will point out to the applicant the advantages of adhering to the plan.

La Grange is a village of 11,000. Its residential districts have given it the reputation of being the garden-spot of its area. For many years there has been a program in the community to maintain this reputation. Village officials have a definite tree-planting program, with annual additions to the fine avenues of elm trees.

The Garden Club has made several notable community plantings along the railroad right-of-way and around two depots, which give passers-by definitely favorable impressions, and it is this commendable work which led the Plan Commission to consider the possibilities of a harmonious architectural plan for the business districts.

"We are not striving for mere uniformity—tenement districts often have uniformity. We are simply after a pleasing architectural style, and we do not expect to achieve our results in a year or two," says E. J. F. Young, Chairman of the Commission. "No coercion will be applied. We hope only to set the standards and point out the advantages of living up to these standards to everyone owning property in the business district."

ROBERT KINGERY,
General Manager, Chicago Regional Planning Association.

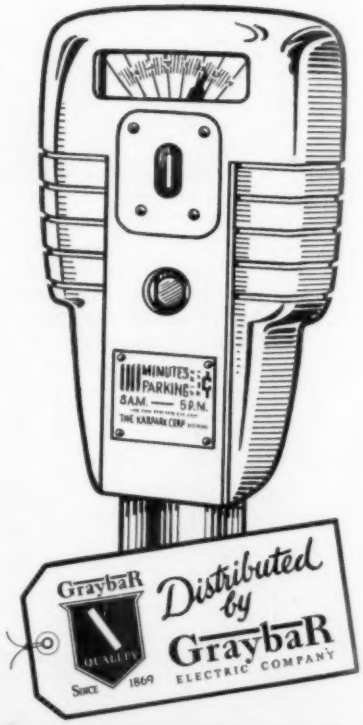
SHOPPING CENTER OF LA GRANGE, ILL.

There are many uglier main streets than this in American cities, but LaGrange sees possibilities for great improvement

KARPARK Announces an *Automatic* PENNY-NICKEL METER!

THIS new model possesses the "thoroughbred" qualities of all Karpark Meters. Those same qualities that met the original parking meter specifications for the District of Columbia, laid down by the U. S. Bureau of Standards. In addition to measuring a legal parking period (and ten minutes over-time) for the usual nickel, the P-N Meter accurately measures successive, fractional parking periods on the insertion of one-cent coins. In all, there are 24 possible coin combination settings for variable time limits of 12 minutes to 2 hours.

"KARPARK"



The new P-N Meter has only *one* coin slot—the motorist *can't* put his coin in the wrong slot and he can't forget to turn the handle—there isn't any—KARPARK is fully AUTOMATIC.

The appearance of the Karpark P-N Meter is the same as the single coin (K-3) model. Raymond Loewy's* original inspiration is still the finest example of parking meter design. Internally, the mechanism is completely rustproof. All parts are either of stainless steel or heavy-gauge clock brass. And *all* Karpark Meters —exclusively—feature the dependable and rugged pendulum control escapement.

→ The KARPARK Corporation invites every city official who wishes to avoid "headaches" in solving parking meter problems, to write for detailed information.

All KARPARK Meters are licensed under the patents of VEHICULAR PARKING LTD.

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*Raymond Loewy, renowned industrial designer, is Consultant for the Pennsylvania Railroad, The Studebaker Corporation, International Harvester Co., Panama R.R. Steamship Co., and many other leading industrial, transportation and utility corporations.

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KARPARK CORPORATION
420 LEXINGTON AVENUE, NEW YORK

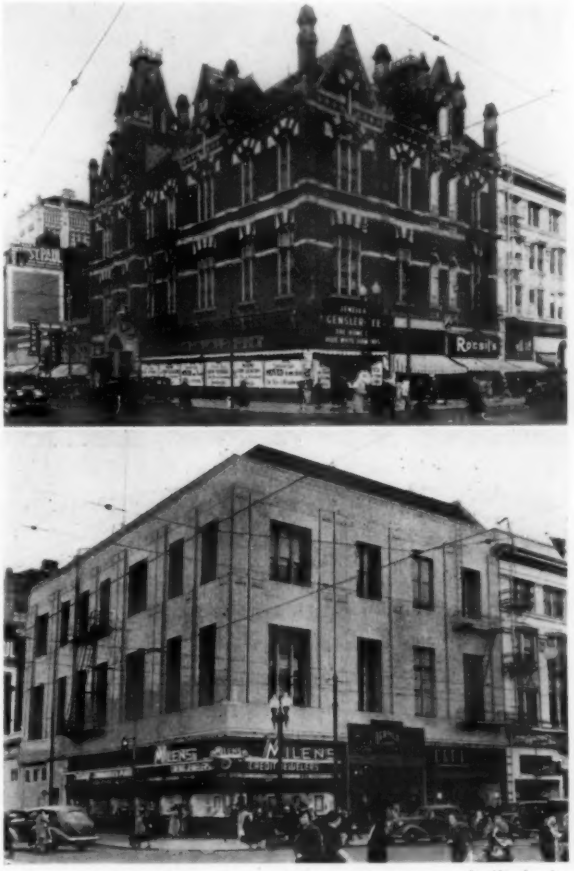
Today Vacancies Are Not a Problem

OAKLAND, CALIF.—An anti-depression movement, started in Downtown Oakland seven years ago, to convert liabilities in the form of old business buildings into revenue-producing assets, has already brought architectural "face-lifting" to thirty such buildings, with plans nearing completion for the remodeling of two more structures. The modernization has been carried on in a thorough manner, the interiors as well as the exteriors having been treated to a new and stylish dress. Less than a half-dozen buildings of old-fashioned architecture remain standing in this business area of a score of square blocks.

During the depressed business period, back in 1932, the members of the Downtown Property Owners Association, Inc., most of whose holdings were in the older business section of Oakland, were faced with the serious problem of holding their tenants or gaining new ones against the competition of newer buildings. Reduction of rents in these older structures meant little or nothing in attracting tenants. Owners of the newer buildings, feeling the pinch of the times, were offering exceedingly low leases. In some instances rents were reduced to the point where the building income did not even meet taxes. Something had to be done.

What amounted to a council of war was held by the Association and its members. A choice of plans was obvious—to replace the obsolete structures with new buildings, or to utilize the sturdy underlying old construction and by a program of alterations bring the buildings up to modern standards and pleasing appearance both inside and out. The latter course seemed the more economically feasible, and an architect was retained by the Association on an annual basis to survey the structures in this area with this plan in mind. Financing plans were next discussed, and though this was a far more complicated problem than was first apparent, a schedule was worked out.

This included a survey and selection of buildings to be modernized; preparation by the architect of detailed plans and specifications on each building, with a color sketch of the structure as it would look when completed; presentation of an itemized statement of costs by a reliable contractor to the individual property owner: assemblying of an estimate of increase in revenue which the owner might reasonably expect from his investment. In addition, the facilities of the Association were placed at the service of the property owner in working out details of financing the modernization work. This entire service was furnished to the property owner free of charge, by the Association, which bore the cost of this part of the program.



Before and after views of one of the 32 structures rebuilt during the modernization program carried forward by the Downtown Property Owners Association, Inc., of Oakland. Modernization has brought increased rentals to property owners and rapidly growing business to the merchants in the area served

The first structure to undergo architectural plastic surgery had been vacant for more than a year, although situated on a busy corner in the heart of this business section. Within thirty days it was shorn of its cupolas, gables, old-fashioned gingerbread decorations, and other features definitely dating it in the nineties, and transformed into a modern tile-walled building of the latest design, with attractive modern show windows. But most important of all is the fact that before the workmen had removed their scaffolding the building was rented.

This definite proof that a liability could be converted into an asset was followed by a steady stream of remodeling programs throughout the area. As the work proceeded, new tenants came or old ones remained at increased rents. Equally important—shoppers came to look at the renovated structures and remained to buy merchandise offered for sale in them.

An important factor in the success of this plan was the cooperation extended by all forces. Edward T. Foulkes, the architect, City Manager J. F. Hassler, Chief Building Inspector E. U. Roussell and Fire Marshal Fred Carlson all cooperated in solving many difficult problems that beset the Downtown Property Owners Association in carrying forward the project.

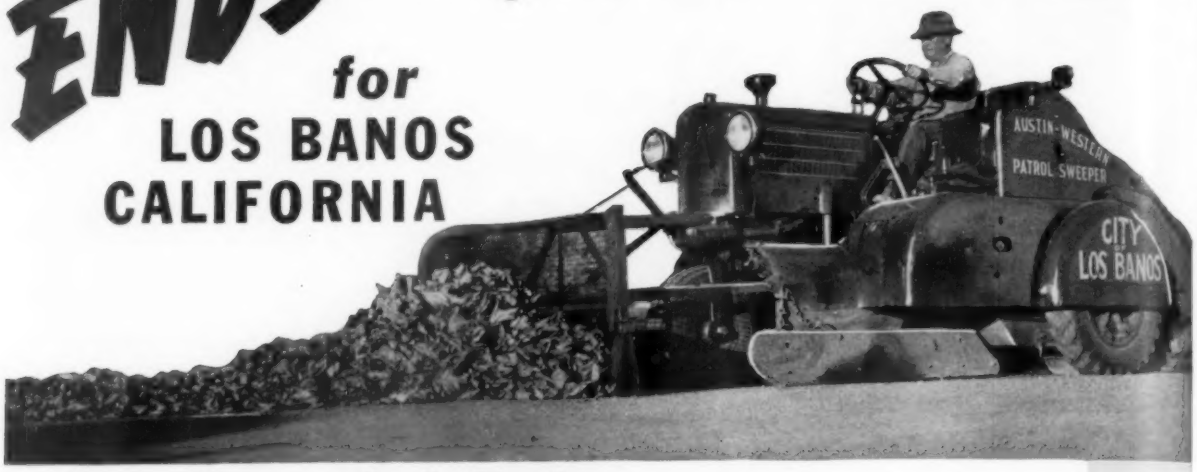
Before the inception of the modernization program, this section of Oakland was threatened with becoming an area of buildings most charitably described as elderly, rapidly filling with memories of past glories rather than with life-producing tenants. Today, vacancies are not a problem. The buildings are filled with stores, and the stores are filled with shoppers. Just try to find a vacancy, is the challenge offered the curious.

DUDLEY W. FROST,
Manager, Downtown Property Owners Association, Inc.

Ideas for Outdoor Children's Theaters

LOS ANGELES playground little theaters are being given unusual stage settings to heighten fairyland illusions this summer. Outdoor childrens' theaters at eight playgrounds will be used by other city play centers in a dramatic schedule that will continue through the vacation period. At one playground the little theater will represent an "Amazing Sprinkling Can," 10 feet high, through which the young thespians will make their entrances and exits. At others the theaters will represent, respectively, a Fairy Castle, a Magic Bird Cage, an Enchanted Forest, a Strawberry Patch, and other motifs. The settings, designed by Robert T. Lee, art instructor at the University of California at Los Angeles, are to be used in plays that will be presented during the season by several hundred children.

ENDS Leaf Removal Problems for LOS BANOS CALIFORNIA



Says Mayor C. S. Taylor:

"About one year ago we became interested in the possibilities of cleaning our streets with a power sweeper. We have about 24 miles of paved streets, all with concrete curb and gutter . . . and lined with various types of shade trees.

"After a series of demonstrations we purchased a Austin-Western Patrol Sweeper with leaf broom attachment.

"We are pleased with the excellent work done by the sweeper, its low operating cost, and the excellent Company Service given. The leaf broom has given particular satisfaction in the handling of fallen leaves of our many trees."

Low first cost combines with small upkeep charges and top sweeping mileage to enable any city — large or small — to economically solve its problem of maintaining safe clean streets. Large accumulations of dry leaves — heretofore a handicap to mechanical sweeping — won't upset your street cleaning schedule when a Leaf-Broom-Equipped Patrol Sweeper takes over your street sweeping job. Write for full details and low cost performance records in cities with paved street mileage and conditions similar to your own. THE AUSTIN-WESTERN ROAD MACHINERY CO., Aurora, Illinois.

Austin-Western

Motor Graders
Roll-A-Planes
Rollers
Snow Plows

Crushing and Screening Plants
Washing Plants
Blade Graders

Motor Sweepers
Shovels and Cranes
Bituminous Distributors
Elevating Graders

5-Yard Tractor Scraper
6-Yard Tractor Scraper
8-Yard Tractor Scraper
12-Yard Hydraulic Scraper

During August we hope you will remember to mention THE AMERICAN CITY.

"Protected" Highways Urged for Essex County, N. J.

IN a recent report by the Town Planning Board of Montclair, N. J., on "Essex County's Relation to Future State Highways Entering New York City from the West," the use of the "protected type" of highway is urged for an important link still to be constructed on Route 10. On this subject the report says:

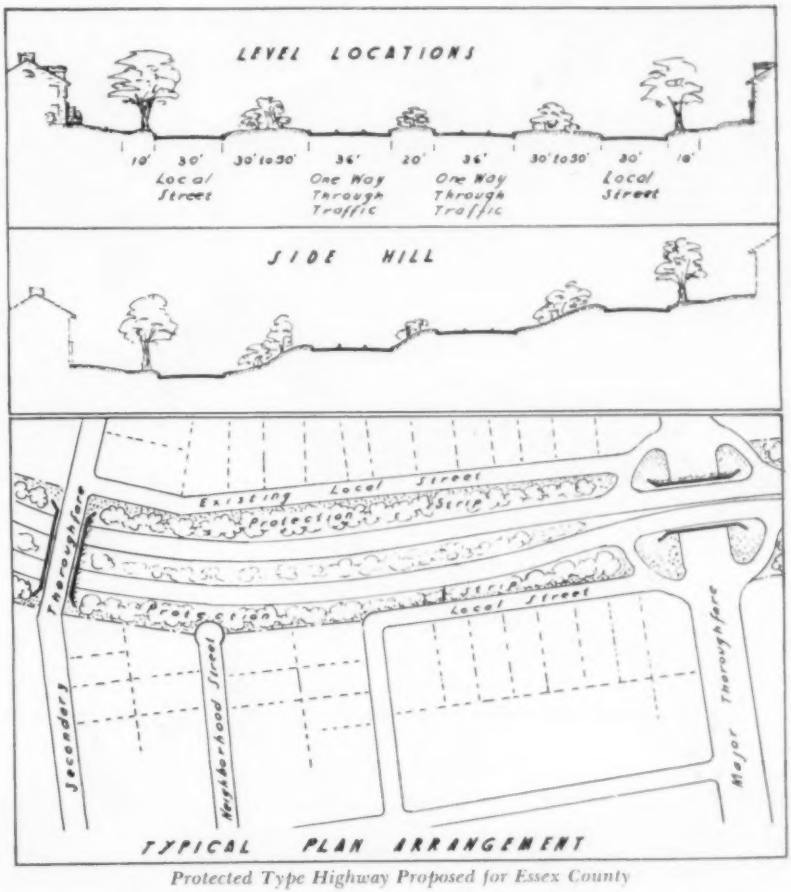
"It appears that the State Highway Department has carefully studied the effect of carrying a heavy volume of traffic through such a highly developed area as the Oranges and Newark, and has keenly in mind the need to protect adjacent land uses and values. In summary, it is understood that opposed traffic would be separated by a planted strip to eliminate the danger of head-on collisions and minimize the effect of headlights; the central express way would be made accessible to the main connecting thoroughfares at designed intervals in keeping with the latest practice; bordering land uses would be insulated from the central express way both by a planted strip on each side wherever possible of a width varying from 30 to 50 feet, and by bordering streets, to serve frontage of bordering uses. These bordering streets would be connected with the local street system; and, where possible, existing streets would be utilized to serve the function of bordering streets. Where no frontage need be served in this fashion, no bordering street would be provided. Cross streets between the designed intersections of the protected highway serving only neighborhood functions would be dead-ended at the highway right-of-way."

This report, submitted by the Montclair Board to the Joint Council of Municipal Planning Boards in Essex County, was endorsed by the Joint Council at its annual meeting in June.

Credit for the ideas embodied in the sketch of typical sections, here reproduced, is given to H. W. Giffin, Engineer of Surveys and Plans, State Highway Department of New Jersey.

In a letter giving permission to THE AMERICAN CITY to reproduce the sketch of the proposed multi-lane super-highway, Mr. Giffin writes:

"This sketch illustrates a little further step in the development of the idea presented by the Montclair Planning Board. The idea, of course, is not new, but its application to state highway design is something of a departure from the usual methods. These highways may be called protected highways and are to be distinguished from freeways in that the frontage along the main road can be utilized in connection with the road with a minimum of interference with main traffic. We shall be very glad to get any reaction to these designs."



Protected Type Highway Proposed for Essex County

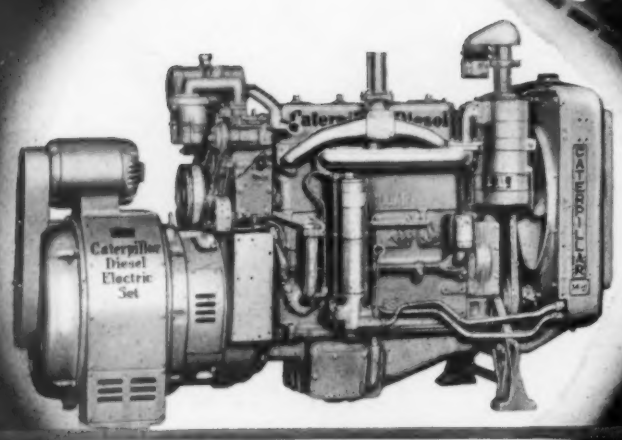
Multi-Lane Super Highway Proposed for New Jersey Route 100, by E. Donald Sterner, Commissioner, N. J. State Highway Department

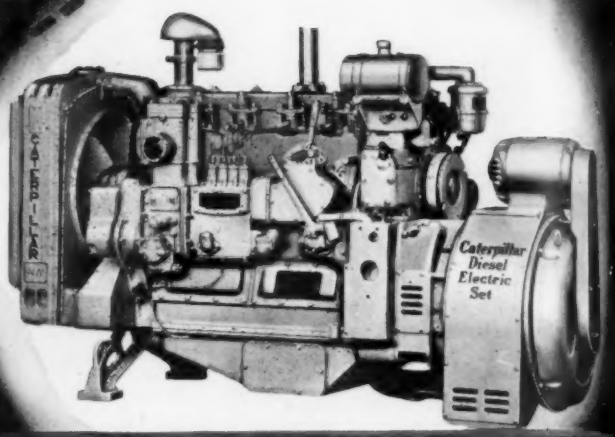
IF carried out as planned, this super-highway will consist of twelve elevated lanes, six for high-speed traffic and six for slow traffic, divided in a series of three lanes each, separated by safety islands and flanked by a landscaped island with entrances at frequent intervals from the marginal local streets. The center island will be raised and planted with a hedge to break headlight glare. This super-highway will provide safety for over 100,000 cars a day and permit unlimited industrial development.

TWO NEW POPULAR-SIZE "CATERPILLAR" DIESEL-ELECTRIC SETS

THAT GENERATE ELECTRICITY AT ROCK-BOTTOM COST

1¢ per KWH*





FOR small-community lighting, regular, stand-by or auxiliary power for municipal garages, airports, hospitals, schools — no other similar source of electric current combines the dependability, simplicity and economy of these new "Caterpillar" Diesel-Electric Sets.

Completely self-contained and self-regulating, these compact plants are easy to locate in small space; easy to start and run; easy to maintain. Set consists of the carefully built and performance-tested "Caterpillar" Diesel Engine, direct-connected through special cushioned coupling to quality-constructed "Caterpillar" Generator. Known the world over, this engine is free from frequent and delicate adjustments (absolutely none required on fuel system). Under ordinary care, maintenance costs are trivial, repairs seldom, and long life certain.

The "Caterpillar" Generator, of sturdy design, is of the double-ball-bearing type, and is made for long trouble-free service. Built-in regulation permits starting large motors with only minor light fluctuations. No "gadgets," no complicated controls, no elaborate electrical installation. A simple, low-cost set-up with power as readily available as water from a faucet! See any "Caterpillar" dealer, or mail the convenient coupon.

*Slightly more or less, depending on local price of Diesel fuel and average load.

CATERPILLAR TRACTOR CO. • PEORIA, ILLINOIS

The 34-15 *(left)*—supplied in 3-phase, 110, 220 or 440 volts at 15 kw. Also as single-phase 110/220 volt 3-wire type and 110, 220 or 440 volt 2-wire type at 13 kw. The 44-20 *(right)*—supplied in 3-phase, 110, 220 or 440 volts at 20 kw.

CATERPILLAR DIESEL POWER

REG. U.S. PAT. OFF.

DIESEL ENGINES—32 TO 160 HORSEPOWER (maximum rating)
DIESEL-ELECTRIC SETS—13 TO 90 KW. (continuous rating)

CATERPILLAR TRACTOR CO., Peoria, Illinois

Please send further information on the new 44-20 and 34-15 "Caterpillar" Diesel-Electric Sets for_____ service.

Name_____

Official Capacity_____

City or Town_____ State_____

Water Rates and Service Charges

1939—Part VI

Covering Domestic and Industrial Meter Rates, Discounts and Penalties, Installation Charges, Fire Hydrant Rentals and Fire Sprinkler Costs

Spencer, Mass.

Present population	6,573
Population served	5,500
Number of active services	965
" " meters	871
" " hydrants	140
Miles of water main	17

Subject to a minimum rate of $1.00 for 500 cu. ft. or less per quarter, the following water rates are charged to persons taking water from the Spencer Water Department:

	Per 1000 Cu. Ft.
First 5,000 cu. ft. (or less) per quar.	$ .20
Next 5,000 " " " " " "	.15
All over 10,000 cubic feet per quarter	.05

Bills for metered water are payable January 10, April 10, July 10 and October 10. When a bill is not paid on or before the first day of the following month, the Water Registrar mails a written notice of its non-payment to the property owner or his agent. If the account is still unpaid after the expiration of ten days, the Water Commissioners turn off the water, and it remains turned off until the account is settled, together with a charge of $2.00 for shutting off and turning on.

All applications for the introduction of water to any premises, or for the extension of any pipe for the conveyance of such water, must be in writing and must state fully the various uses to which the water will be applied. Taps for service connections are made by the town, and stop cocks and lead connections to iron pipe are furnished by it, the length of the lead connection being at the discretion of the Commissioners. All meters are furnished and set at the town's expense.

No hydrant rentals are charged the town, and private fire protection via automatic sprinkler systems has no charge.

E. L. MARSDEN,
Superintendent, Water Department.

Greeley, Colo.

Present population	14,705
Population served	18,000
Number of active services	3,663
" " meters	670
" " hydrants	187
Miles of water main	54.9

Flat rates are used largely in Greeley for residences, the charges being $8.50 for a residence occupied by one family and having four rooms or less. The charge for each additional room is $1.20, and for one or more water-closets $2.50, and one or more bathtubs $.80. These are annual charges. Premises without service pipes, but using water from other premises, with permission of the owner, pay $7.60 per year. The meter rates are:

First	10,000 gals.	$ .17	per 1,000 gals.
Next	40,000 "	.13	" " "
"	50,000 "	.09	" " "
"	400,000 "	.065	" " "
"	500,000 "	.055	" " "
Over	1,000,000 "	.05	" " "

These rates carry a minimum charge of $1.35 per month, and the meters are read monthly. On each meter bill as well as on the flat rate bill 10% is for the maintenance and operation of the sewage-treatment plant. Where flat rates are paid, the sewer charge is $1.50 per year, which is also the minimum on meter bills.

The meter rates for consumers outside the city limits are 21¼ cents per 1,000 gals. with a minimum charge of $1.70 per month.

Applications for licenses to use water are issued at the office of the City Water Collector and require a statement of the name of the consumer, the premises, and the nature and extent of the appliances and fixtures. No tap connected to a service pipe may have an orifice greater than ¾", and all taps are of brass with copper service pipe. The city furnishes at cost the service pipe, corporation cock, curb cock, stop-cock box, saddle for converse joints. From the stop cock to the premises, the owner must provide his own pipe and plumbing.

When the Superintendent is required to shut off the water from any premises for violation of the regulations, water is not turned on again until all arrears in water rates are paid and the sum of $1.00 for turning on the water is paid in full.

All fire hydrants are installed and maintained by the Water Department, for which the city pays on account of its use of water for fire protection and for sprinkling streets and parks the sum of $30 for each fire hydrant per year, paid out of the appropriation for the Fire Department, and the sum of $750 paid out of the street fund for the use of water for sprinkling, and $1,500 from the parks fund for the use of water for sprinkling parks.

C. O. BURSIEL,
City Water Collector.

Lodi, Calif.

Present population	10,500
Population served	10,395
Number of active services	2,747
" " meters	150
" " hydrants	207
Miles of water main	37

Water for dwellings, stores, offices and shops is still on a flat-rate service in Lodi, but should an applicant desire a water meter, he pays the cost, together with the cost of installation. If the city desires to meter a water service, the city bears the expense. Water supplied through meters is billed at the following rates:

		Per 100 Cu. Ft.
First	50,000 cu. ft per month	$ .05
Next	200,000 " " " "	.04
All over	250,000 " " " "	.035

In addition, there is a monthly demand charge of 75c per meter. The minimum monthly bill where a ¾" or smaller meter is installed, is $1.50; through a 1" meter, $2.00 per month; and for each ½" increase in size of meter over 1", the minimum charge is increased $1.00 per month; provided that when water service is used for standby or emergency service only, the minimum charges are multiplied by 5. All larger consumers of water are served by meter.

Bills for water are due the first day of the month succeeding the month in which they are incurred, and those unpaid by the 10th of the month have a penalty of 10c added. If unpaid by the 20th of the month, the service is discontinued after a written notice has been mailed or left at the address of the delinquent customer.

Applications for a new service or for changing or discontinuing water service are made at the office of the City Clerk on forms provided by the city. A cash deposit of $3.00 to guarantee payment of water bills is required, and on other than domestic services a deposit of not to exceed twice the average estimated monthly bills is required. If this estimate requires a deposit of over $100, the City Clerk may accept in lieu of such deposit a bond in double the amount of the estimate.

The cost of tapping water mains and of taking the water service to a point at the curb or to 1 ft. outside the property line in alleys is paid for by the owner of the premises. Water taps are made only by duly authorized agents of the city, and the applicants must pay the following charges for taps:

¾" water tap on 2" water main	$6.00
¾" " " " larger water main	7.50

All other water taps are charged at the cost plus the cost of removing and replacing any pavement that is necessary.

There is no charge to the city for the

LOOK through to the future a century hence, you men who are planning and constructing cast iron underground mains, and what can you be sure of! Just this: cities may be destroyed—mains abandoned or relocated—but there will be a *hundred years or more of useful life* in every length of cast iron pipe, whether it be pit cast or centrifugally cast by the Super-de Lavaud chill-free process.

U.S. cast iron PIPE

Centrifugally or pit cast for water, gas, sewerage, drainage and industrial service.

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General Offices: Burlington, N. J.
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installation and maintenance of fire hydrants, except that the Water Department takes a credit of $6.00 per year per hydrant in the annual report. There is no charge for services or connection to automatic fire sprinkler systems on private property.

JOHN A. HENNING,
Superintendent of Public Works.

Bellingham, Wash.

Present population	37,250
Population served	42,500
Number of active services	10,571
" " meters	2,390
" " hydrants	750
Miles of water main	145

Rates for metered water service in Bellingham are as follows:

Minimum charge allowing 400 cu. ft.	$ .75
400 cu. ft. to 30,000 cu. ft.	.07 per 100 cu. ft.
30,000 cu. ft. and up	.04 " " "

All water bills are mailed monthly and must be paid by the end of the month following or a penalty of 25c is added.

The consumer pays for the installation of all services. A deposit of $18 is required for a ¾" tap, and $20 for a 1". The city furnishes the meters up to 1" in size free of charge. Larger meters must be paid for by the consumer.

Outside the city limits consumers pay for all meters, and the minimum rate is $1.25.

No charge is made for either a shut-off or a turn-on.

The city is charged $1.50 per month for the use of hydrants for fire protection, and no charges for automatic sprinklers for private use are in effect.

GEORGE A. BROCK,
Superintendent, Water Department.

Cedartown, Ga.

Present population	10,000
Population served	9,500
Number of active services	1,400
" " meters	1,300
" " hydrants	120
Miles of water main	33

Meters are read every 30 days, and the reader is required to notify the landlord or tenant on his meter route whenever he finds that the bill is above the average. In this way the good-will of the consumers is won. A record of such reports is made in case of later complaints. The water rates in Cedartown, which have been in effect since December, 1929, are:

First	500 cu. ft.	$ .20 per 100 cu. ft.
Next	1,500 " "	.15 " " " "
"	4,000 " "	.125 " " " "
"	4,000 " "	.10 " " " "
"	10,000 " "	.08 " " " "
Over	20,000 " "	.06 " " " "

The minimum charges, based on the size of the meter, are as follows:

⅝" meter	$1.00 per month
¾" "	1.00 " "
1" "	3.00 " "
1½" "	3.50 " "
1½" "	4.00 " "
1½" "	5.50 " "
2" "	10.00 " "

If water bills are not paid on or before the 10th of the month, an extra charge of 50c is made, and water is cut off from such delinquents without notice.

The rates charged for tapping the water mains and including the cost of all materials and labor furnished to carry the service to the curb, including the installation of the water meter, are as follows:

¾" water connection	$12.50
¾" " "	18.75
1" " "	25.00
2" " "	50.00

The Board of City Commissioners, beginning October 4, 1938, has charged a sewer tax providing for the operation, interest charges and retirement of bonds incident to the construction and operation of the city sewage-treatment plant. There is a minimum charge of 50c per house, and all sewage taxes are assessed on the water bills and are payable monthly. The rates are:

First	500 cu. ft.	$ .10 per 100 cu. ft.
Next	1,500 " "	.05 " " " "
"	30,000 " "	.04 " " " "
"	60,000 " "	.035 " " " "
"	120,000 " "	.03 " " " "
"	240,000 " "	.025 " " " "
Over	452,000 " "	.01 " " " "

J. E. RAINWATER,
Superintendent, Water Department.

Stockton, Calif.

Present population	60,000
Population served	55,000
Number of active services	13,327
" " meters	13,694
" " hydrants	857
Miles of water main	172.5

Different schedules of metered water rates for winter and summer months are in force in Stockton. For water consumed during January, February, March, October, November and December of each calendar year the rates are:

	0 to 2,700 cu. ft.	$ .186 per 100 cu. ft.
2,700	" 6,700 " "	.112 " " " "
6,700	" 40,000 " "	.074 " " " "
40,000	" 66,600 " "	.068 " " " "
All over	66,600 " "	.045 " " " "

For water consumed in the months of April, May, June, July, August and September they are:

	0 to 1,300 cu. ft.	$ 16⅔ per 100 cu. ft.
1,300	" 2,700 " "	14 " " " "
2,700	" 6,700 " "	.112 " " " "
6,700	" 40,000 " "	.074 " " " "
40,000	" 66,600 " "	.068 " " " "
All over	66,600 " "	.045 " " " "

A minimum charge of $1.00 per month is made on meters of 1" and under, and $.50 for each additional ½" on meters over 1" in size.

Any person or corporation whose premises are adjacent to the company's distributing mains can obtain service by signing an application on the regular form used by the company for the particular class of service desired. The applicant is required to make satisfactory establishment of credit, under which conditions a service is installed free of charge to the consumer. Where an extension of the company's mains is necessary, or a substantial investment is required to supply a service, the applicant, upon application to the company, is informed as to the conditions under which service will be supplied. This usually means that the consumer has to advance the cost of a main extension in excess of 150 ft. The deposit for the extension is returned to the consumer under various methods, depending upon the agreement.

Water for fire hydrants, which are owned by the city, is charged for at the rate of $1.00 per hydrant per month. Charges for sprinkler heads for private fire protection are:

4" connection	$4.00 per month
6" "	6.00 " "
8" "	8.00 " "

The above rates are applicable only to private fire-extinguishing service to which no connections for other than fire protection purposes are allowed. The company is permitted to install a standard detector type meter approved by the Board of Fire Underwriters for protection against theft, leakage or waste of water. If a distribution main of adequate size to serve a private fire-extinguishing system in addition to all other normal service does not exist in the street or alley adjacent to the premises to be served, then a service main from the nearest existing main of adequate capacity is installed at the expense of the applicant.

R. F. BROWN,
Manager, California Water Service Co.,
Stockton, Calif.

Charles City, Iowa

Present population	8,039
Population served	6,500
Number of active services	1,900
" " meters	1,877
" " hydrants	198
Miles of water main	34

For water used during each three-month period, metered customers of the Charles City Water Department are charged as follows:

First	9,000 gals.	$ .30 per 1,000 gals.
Next	15,000 "	.25 " " "
"	36,000 "	.20 " " "
"	240,000 "	.15 " " "
"	300,000 "	.10 " " "
Over	600,000 "	.07 " " "

A service charge of 10c is added to each bill every month, and no bill can be less than $1.20 per quarter, or 40c per month. A discount of 5% is allowed if bills are paid within 10 days after being rendered, but no discount is given on the minimum rate.

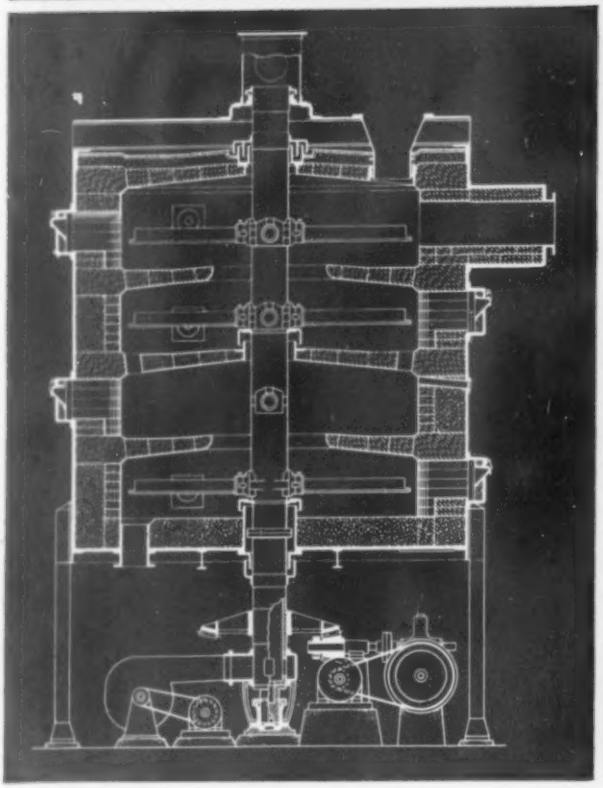
A standard charge of $1.50 is made for a permit for either the mains or inspection, and all new services must be installed by plumbers.

Water is turned off without notice if bills are not paid within 30 days after they become due. In the event that the water of any customer is cut off for violation of any of the provisions of the Charles City water ordinance, the water is not turned on again except by order of the City Clerk and the payment of the sum of $2.00 for the cutting-off and turning-on of the water. All users of water are required to keep service pipes and fixtures in good condition and to repair and protect them from frost at their own expense. Water is not turned on for any customer whose service pipes are out of repair or have improper fittings.

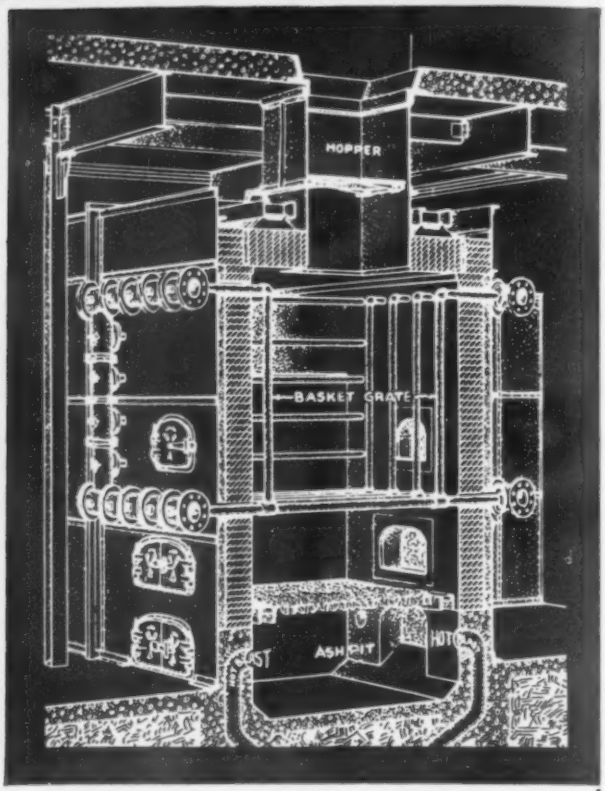
No rentals are charged the city for either public or private fire hydrants, or for sprinkler heads privately installed.

L. R. HIGHT,
Superintendent, Water Department,
Charles City, Iowa.

TWO TYPES OF INCINERATORS
FOR MUNICIPAL SANITATION AND EFFICIENCY



Nichols Herreshoff Sewage Sludge Incinerator



Nichols Decarie Basket Grate Refuse Incinerator

Burning — properly controlled — is the most satisfactory, sanitary and efficient method of disposing of sewage sludge, garbage and refuse. It reduces to harmless mineral ash everything which might be dangerous to health or become a public nuisance.

Nichols Herreshoff Sewage Sludge Incinerators are now providing positive, sanitary and efficient disposal of sewage sludge for communities with a total population of over 2,100,000, by reducing to an odorless, sterile, inorganic, fine ash over 1,400 tons of sewage sludge every twenty-four hours.

Nichols Decarie Basket Grate Refuse Incinerators have been providing an easy, efficient and economical method of disposing of the garbage and refuse of large and small cities, all over the country, for the last forty years.

If you have a sludge or refuse disposal problem a Nichols engineer will gladly assist you in arriving at a solution — and without obligation of any sort.

NICHOLS
ENGINEERING & NERCO RESEARCH CORP.

60 WALL TOWER NEW YORK, N. Y.

Kingsville, Texas

Present population	10,000
Population served	10,000
Number of active services	2,000
" " meters	1,650
" " hydrants	100
Miles of water main	Unknown

Within the city limits of Kingsville, customers are charged the following rates for water used:

First	3,000 gals.	$1 25	
Next	7,000 "	20	per 1,000 gals.
All above	10,000 "	.17	" " "

Outside the city limits the rates are:

First	3,000 gals	$2 00	
Next	7,000 "	.25	" " "
All above	10,000 "	.17	" " "

Deposits made with the application for water service also vary, as within the city limits customers pay $3.00, and outside $4.00. No charge is made for the installation of services.

There are no rental charges on fire hydrants, nor for sprinkler heads for private fire protection.

F. D. YEARY,
Water Works Superintendent,
Kingsville, Texas.

Bozeman, Mont.

Present population	8,000
Population served	7,500
Number of active services	2,000
" " meters	500
" " hydrants	191
Miles of water main	39

Domestic and commercial meter rates for water consumed in Bozeman are as follows:

First	500 cu. ft., or less	$1 00	
Next	1,300 " "	.14	per 100 cu. ft.
"	1,700 " "	.09	" " "
All over	3,500 " "	.072	" " "

During June, July and August a special irrigation rate for lawns and gardens is in force. This is 3½c per 100 cubic ft. for all over the normal domestic consumption during the non-irrigation months.

The industrial meter rates for water consumption are:

		Monthly Per 1,000 Cu. Ft.
First	3,000 cu. ft.	$1 30
Next	1,000 " "	1 05
"	1,000 " "	1 00
"	5,000 " "	.80
"	20,000 " "	.60
"	70,000 " "	.55
"	2,900,000 " "	
All over	3,000,000 " "	

Also, the city has meter rental charges per year as follows:

½"	$1 00
¾"	1 00
¾"	1 75
1"	2 50
1¼"	3 25
1½"	3 75
1¾"	4 00
2"	4 25
2¼"	4 25
2½"	4 50
2¾"	4 75
3"	5 00
4"	6 00
6"	15 00

On original installations the city puts water into a basement on an estimated charge, which is simply a deposit for which the consumer is given full credit on future water rentals until the amount of such deposit is exhausted, and which is required merely as a guarantee that water will be used after the service is installed. This must be deposited with the application. For a residence located 25 ft. from the front line of a lot, the deposit is $35.50, on unpaved streets, a $5.00 additional charge being made on paved streets. On renewal installations the city bears the complete cost, and new or renewal services are maintained by the city from the water main to the consumer's basement without charge.

A hydrant rental of $10 each per year is made to the city.

L. S. THORPE,
City Engineer, Bozeman, Mont.

Gaffney, S. C.

Present population	6,827
Population served	10,000
Number of active services	2,062
" " meters	2,111
" " hydrants	200
Miles of water main	28

Gaffney's minimum charge for water is 50c per month, with an allowance of 1,667 gals. given fo rthis rate. Rates for additional water used are:

Up to	7,500 gals.	$ 30	per 1,000 gals.
7,500 to	25,000 "	25	" " "
25,000 "	50,000 "	225	" " "
50,000 "	100,000 "	20	" " "
100,000 "	200,000 "	175	" " "
200,000 "	300,000 "	16	" " "
300,000 "	500,000 "	15	" " "
All over	500,000 "	135	" " "

All water bills are net, and are due on the 1st through the 10th of each month.

There is no rental charged for fire hydrants, nor for sprinkler connections for private fire protection.

L. V. GAFFNEY,
Superintendent, Water and Light Plant,
Gaffney, S. C.

Willmar, Minn.

Present population	7,000
Population served	Unknown
Number of active services	1,504
" " meters	1,504
" " hydrants	104
Miles of water main	16

Rates for water used in Willmar are:

First	1,000 cu.ft. per quarter	$ 25	per 100 cu. ft.
Next	1,000 " " " "	.20	" " " "
"	1,500 " " " "	.15	" " " "
"	1,500 " " " "	.10	" " " "
"	4,000 " " " "	.08	" " " "
Excess	" " " "	.06	" " " "

The minimum water rate is $3.00 per year.

Water services are installed by plumbers and paid for by property owners. When taps are made and new services run, the water must be turned off at the curb, and not be turned on until the Water Department has installed or inspected the meter installation, and under no circumstances are plumbers or others not in the Department's employ allowed to turn on water at unmetered services. In making a connection with the water mains, plumbers are required to make the tap at an angle of 45° with the vertical, and the service pipe must be laid 6 ft. below the grade of the street at a point within 2 ft. of the main, and be continued at that depth to the line of the street. All connections with the water main must be made by screwing the corporation cock directly into the main, using a corporation cock no larger than 1". For 1¼" and 1½" pipe, a manifold of two corporation cocks must be used. For connections larger than 1½" pipe, applications must be made to the Water Department for specific instructions.

Fire hydrants for public fire service are charged to the city at the rate of $15 each per year, but as yet no charge has been stipulated for sprinkler heads for private fire protection.

E. T. KLEVE,
Superintendent, Water and Light Department, Willmar, Minn.

Gainesville, Fla.

Present population	12,274
Population served	14,000
Number of active services	2,718
" " meters	2,810
" " hydrants	260
Miles of water main	30

The minimum rate per quarter for 15,000 gals. of water or less used within the city is $3.00, and this sum is payable in advance. For the next 15,000 gals. the charge is 15c per 1,000 gals. and all water used over 30,000 gals. is billed at 12.5c per 1,000 gals. For offices or houses of three rooms or less, the minimum charge is $1.50 per quarter for 7,000 gals. or less. All water used over 7,000 gals. is billed at the regular rate. The surcharge outside the city is 25%.

Applicants for water service must sign a special application at the office of the Director of Finance and pay in advance the charge for the end of the first quarter. For new services the customer pays for the tapping of the main, for the pipe from the main to inside the property line, for the meter box, meter yoke, valve box, and stop and waste cock; while the city furnishes the labor and meter.

There is no charge for private fire hydrant connections, and a book entry of $36 per year per hydrant is made for the profit-and-loss statement of the Water Department for the public fire-hydrant service. No charge is made for sprinkler heads for fire protection.

A. CLARENCE O'NEILL,
Director of Finance.

Stillwater, Minn.

Present population	7,173
Population served	10,000
Number of active services	1,700
" " meters	1,625
" " hydrants	255
Miles of water main	24 11

The water rates charged by the Board of Water Commissioners of Stillwater are:

First	10,000 gals. or less per month	$ 20	per 1,000
Next	190,000 " " " "	12	" "
Over	200,000 " and up to 500,000 gals. per month	09	" "
Over	500,000 gals. per month	06	" " (flat)

The sliding scale does not apply on consumption exceeding 200,000 gals. per month, and it is also provided that no one should pay more for water than if he had come under the next lower rate. The minimum rate is $4.00 for 6 months for 20,000 gals. payable in advance from the 1st day of January and the 1st day of July each year except where bills are rendered monthly. Property owners are held responsible for the water bills of renters.

When application for water service is made to the Board of Water Commissioners, the engineer makes an estimate, and this cost must be paid in advance

Can Your City Afford to Treat *Ground Water?*

READ THESE FACTS PUBLISHED IN A RECENT ARTICLE

"Flow readings taken at the outlet of a 48-inch sewer laid in 1908 disclosed a maximum discharge of 5.3 *m.g.d.* for an area serving 19,000 people. Since the average water pumpage ran only 2 *m.g.d.* the remainder obviously was due to ground water leakage.

Almost 3.0 million gallons per day of this was eliminated by caulking the joints for a distance of 7,628 feet. This operation cost the city $7,476 and required two years for completion."

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There are fewer sources of leakage in an Armco Sewer because its long lengths mean fewer joints per mile. This also helps reduce installation costs.

Water-tight joints are assured by sturdy bolted couplings that join each section into a tight line that will not break or separate. No cradling is needed.

• With State Boards of Health demanding effective treatment of all domestic sewage, it is becoming vitally important to eliminate every possible gallon of ground water leakage into sewers.

To solve this problem economically you need a sewer pipe with strong, water-tight joints; a pipe with enough strength and flexibility to overcome unequal settlement. Yet can you be sure of these results with short sectional types? Some say, yes. Some say, no. But in any event you can be *doubly* certain with Armco Sewer Pipe because its sturdy corrugated iron construction and tightly-coupled joints eliminate all danger of breakage and infiltration.

Besides, Armco Sewer Pipe ends the worry of material failure. Its galvanized iron base already boasts a 32-year service record in sewers. And remember, this pipe is paved in the bottom and fully coated with a special bituminous material inseparably bonded to the pipe. Write for 48-page Sewer Book. Armco Culvert Mfrs. Assn., Middletown, O.

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to the applicant from the main to the meter.

There are no private hydrants in Stillwater. The city is supposed to pay $5,000 per year to the Board of Water Commissioners. This amount includes hydrant rentals. Where sprinkler heads are installed for private fire protection on any service, there is a charge of 5c per head per year.

HERBERT S. GROVE,
General Manager.

Marshfield, Wis.

Present population	9,000
Population served	8,000
Number of active services	2,118
" " meters	1,955
" " hydrants	245
Miles of water main	63½

The water rates for the domestic consumers in Marshfield are:

First	1,859 cu. ft.	$.26¼	per 100 cu. ft.
Next	1,741 " "	.22½	" " " "
"	8,400 " "	.18¾	" " " "
Next	18,000 " "	.15	" " " "
Over	30,000 " "	.11¼	" " " "

Water consumers are subject to a minimum charge of $2.50 per quarter, which is equivalent to a use of 954 cu. ft., or 7,155 gals. A 10% penalty is added to the bill if not paid by the 20th of the month, and if not paid before the 25th of the month, service is discontinued without further notice.

To obtain a water service, the customer is required to pay for the installation of a lead pipe and also the charge for tapping the main for the size service installed. The charges made by the Marshfield Electric & Water Department for tapping are:

¾"	$2.25
1"	2.50
1"	3.15

The public rental charge per hydrant is $70 per year, but there are no public hydrants. There are no places connected solely for sprinkler head fire protection service.

R. F. CRAMER,
Auditor, Marshfield Electric and Water Department.

Childress, Texas

Present population	8,500
Population served	7,000
Number of active services	1,496
" " meters	2,000
" " hydrants	101
Miles of water main	17.5

A minimum charge of $1.50 per month is made, and following are the regular rates:

First 3,000 gals.	$.50	per 1,000 gals.	
All water used up to 1,000,000 gals. per month	.25	"	"
Water used over 1,000,000 gals. per month	.15	"	"

Special summer discount rates are given for water used during the months from April through September for domestic use only, to encourage home beautification. These discounts are:

$3.00 to $3.95	10%
4.00 to 4.95	15%
5.00 to 5.95	20%
6.00 and over	25%

No discount is allowed on water bills of less than $3.00.

A $5.00 deposit is required with all applications for water service, and an installation charge of $1.00 is made.

There are no hydrant rentals nor charges for sprinkler heads for fire protection.

WHITT JOHNSON,
City Secretary.

Beckley, W. Va.

Present population	13,000
Population served	20,000
Number of active services	4,205
" " meters	4,377
" " hydrants	96
Miles of water main	60

The Beckley Water Co. supplies not only the city of Beckley, but the adjacent community of Mabscott. The water rates are as follows:

First	2,000 gals.	$.55	per month
Next	3,000 "	.50	" "
"	20,000 "	.45	" "
"	125,000 "	.30	" "
All over	150,000 "	.25	" "

A discount of 5% is allowed on a bill if it is paid not later than the 10th of the month. No discount is allowed on minimum charges or on accounts in arrears.

Applications for water service must be made by the interested parties in person. The company makes no charge for the installation of water services.

A charge of $50 per year is made for rental of both public and private hydrants. The charges for private fire-protection sprinkler heads is $100 per year for each 6" tap, with no limit as to the number of heads which may be attached to laterals.

CHARLES C. FARMER,
Secretary and Treasurer, Beckley Water Co.

South Hadley Falls, Mass.

Present population	5,670
Population served	5,670
Number of active services	950
" " meters	947
" " hydrants	190
Miles of water main	18.35

The domestic water rates in South Hadley Falls are $2.25 for 1,500 cu. ft. or less per quarter, and 12c per 100 cu. ft. in excess of 1,500 cu. ft. The business rate is 12c per 100 cu. ft. for the first 10,000 cu. ft. per quarter, and 8c per 100 cu. ft. thereafter.

An applicant for water service signs the standard form in the office and makes a deposit of $15 to assure the payment of bills. The applicant further pays the entire cost of the installation of the water service.

No charge is made for fire hydrants nor for sprinkler heads installed for fire protection.

MAURICE E. FITZGERALD,
Superintendent, Water Department.

Goshen, Ind.

Present population	12,500
Population served	10,000
Number of active services	2,800
" " meters	3,000
" " hydrants	250
Miles of water main	34

The residential and industrial water schedules for Goshen are identical and are made up of a primary usage charge and a surplus charge, as follows: A net charge of 13c per 100 cu. ft. is made for primary usage of water, and a charge of 3c per 100 cu. ft. for surplus usage. The primary usage is based on the size of meter, as follows:

¾"	meter	$.50	net for	5,000	cu. ft per month
¾"	"	.75	" "	6,000	" " " "
1"	"	1.25	" "	8,000	" " " "
1.5"	"	1.75	" "	10,000	" " " "
2"	"	3.00	" "	15,000	" " " "
3"	"	5.00	" "	25,000	" " " "
4"	"	10.00	" "	40,000	" " " "
6"	"	15.00	" "	60,000	" " " "

Applications for water service are filled out by the prospective customer at the office of the City Light & Water Works and filed for reference. The charges for installation of a water service are as follows:

¾" service	$20.00
1" "	30.00
1¼" "	40.00
1½" "	50.00
2" "	75.00
3" "	110.00

If the water service is to be installed under a hard-surface pavement, $5.00 is added to the price. The cost of installation of all services over 3" in size is based on time and materials used. For the figures listed above, the service line is connected to the main and carried to the curb or sidewalk of the street and the charge includes the cost of a curb stop and shut-off box.

Rental for public hydrants for fire use only is $40 per hydrant per year. Sprinkler services for fire protection in industrial buildings or commercial houses are charged on a flat rate basis of $25 per year.

MERLE J. MILLER,
Superintendent of Utilities.

Chanute, Kans.

Present population	10,800
Population served	10,800
Number of active services	2,870
" " meters	2,870
" " hydrants	182
Miles of water main	57

The water rates in Chanute are as follows:

0 to	1,200 cu. ft.	$.25	per 100 cu. ft
1,201 to	12,000 " "	.17½	
12,001 to	120,000 " "	.12½	
120,001 to	1,200,000 " "	.10	
1,200,001 to	12,000,000 " "	.09	
12,000,001 and over	" "	.08	

The minimum charge is 50c per service per month.

The Water Department makes no charge for the installation of water services, and makes no hydrant rental charge either for public or for private fire hydrants, nor for services for sprinkler heads for private fire protection.

ROSS COOPER,
City Clerk.

If Your Community Has Less Than 10,000 Population

Have you installed any recent public works projects or improved methods of municipal administration that you believe would be of interest to officials or engineers in other small municipalities?

If so, please send us a brief descriptive item, and let us know if photographs or other illustrations are available if we could use them.

The American City wishes to devote more space in future to interesting activities in small places. The cooperation of readers in making available such material will be appreciated.

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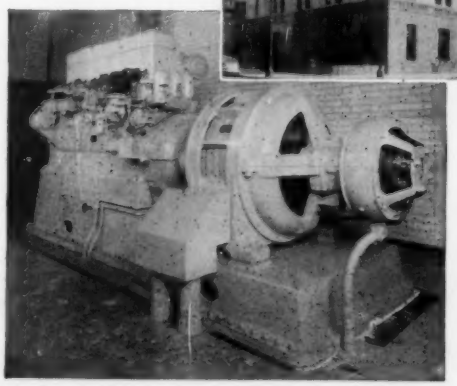

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Taxation of Municipal Obligations and Salaries

CURRENT proposals to abolish the tax immunity enjoyed by public employees on their salaries and by public agencies on the interest from their securities are given expert legal consideration in a July, 1939, publication of the American Municipal Association. This 50-page mimeographed pamphlet is a report* of the Committee on Taxation of Municipal Obligations and Salaries of the Municipal Law Section of the American Bar Association.

In a Foreword by Arnold Miles, Assistant Director of the American Municipal Association, it is pointed out that:

"Some legal history has been made by the recent decisions of the Court in the Gerhardt and O'Keefe cases and by the adoption of the Public Salary Tax Act of 1939, Public 32, 76th Congress, signed by the President, April 12, 1939,† and that the abolition of the tax immunity of interest on public securities was still under consideration by Congress as this report went to press."

The findings, conclusions and recommendations of the Committee are summarized as follows:

1. The Sixteenth Amendment to the Constitution did not convey power to levy a new generic tax, but merely removed the requirement for apportionment which made a Federal income tax unworkable.

2. The O'Keefe and Gerhardt cases have abolished all reciprocal exemptions of public salaries from the application of the Federal and state income taxes.

3. These cases specifically reaffirmed the theory of dual sovereignty and intergovernmental immunity of the Federal and state governments and their instrumentalities from interference by the other.

4. The decisions in these cases do not by necessary legal inference abolish the immunity of income from public securities, particularly municipal obligations, from the Federal income tax.

5. It appears from experience with various taxes on municipal obligations and from the testimony of authorities and experts in the field of public finance, including U. S. Treasury Department experts, that the imposition of the Federal income tax on new issues of municipal obligations would materially interfere with the issuance and sale of said obligations and that a substantial portion of the tax will be passed on by the purchasers of future obligations to local governments in the form of higher interest rates which they will be obliged to meet out of real estate taxes.

6. The validity of the application of the Federal income tax to income from interest on public securities will depend on whether or not the Court will hold the effect of the tax too indirect and remote to constitute an interference with the operation of an essential function of government or whether the difficulties of financing and the higher interest cost would be found to constitute an unwarranted interference with the intergovernmental immunity implied in the constitution.

7. The abolition of income tax immunities of securities would solve only a small part of the tax exemption or immunity problem, for the administration proposal does not contemplate making its securities subject to state and local general property taxes, nor does it touch many other of the vast field of tax exemptions.

8. Successful application of the principle of the Gerhardt and O'Keefe cases to income from securities of state and local governments under the apparent difficulties of finance caused thereby would weaken the theory of intergovernmental immunity to the point where such action would be a precedent for the taxation of the income of states and their instrumentalities.

9. The Federal income tax is the most important income tax at present because of its rates. It can be applied to income from Federal securities without any constitutional inhibition.

10. As a matter of equity, municipal interest should be considered in extending the tax power of the states and Federal governments to municipal securities or activities, and any such additional burden imposed upon them should be accompanied by some tax concession or a distribution of centrally collected revenues as a matter of right to offset that burden.

11. In view of the constitutional difficulties involved in the Federal proposal, both as to its immediate effect on finances of states and their instrumentalities and in its possible ultimate application to the states and municipalities, your committee recommends, *first*, against the extension of the Federal tax power to the states and their instrumentalities, because of the effect of such tax and the centralization of power upon the sovereignty of the states, and, *second*, because of the possibilities of the interference with the financing of states, and especially with city government finances, by imposing the Federal income tax on them, if the Federal income tax is to be imposed upon state and municipal securities authority therefor should be secured first from the several states by a proper amendment to the constitution.

* The Committee consisted of Henry Epstein, Solicitor General, State of New York; Albert B. Houghton, Attorney at Law, Milwaukee, Wis.; H. P. Kucera, City Attorney, Dallas, Texas, and Chairman of the City Attorney's Section of the League of Texas Municipalities; Giles J. Patterson, Attorney at Law, Jacksonville, Fla.; F. T. Van Lieu, City Solicitor, Des Moines, Iowa, and Ambrose Fuller, Legal Consultant, American Municipal Association, who, as Chairman, directed the work of the Committee in preparing the report.

The report is obtainable at $1 from the American Municipal Association, 1313 E. 60th St., Chicago, Ill.

† See THE AMERICAN CITY for May, 1939, page 63.

Towards a Code of Conduct for Local Government Officers

Local Government Service, the monthly magazine of the National Association of Local Government Officers of Great Britain, publishes on the cover of its July, 1939, issue a Statement of Professional Ethics for Local Government Officers, adopted by the Association at its 1939 Conference as a foundation upon which a Code of Conduct can be built. The full text follows:

"The first duty of a local government officer is to give his undivided allegiance to the authority employing him. With his private activities the authority in general is not concerned, so long as his conduct therein is not such as to bring discredit upon the service in which he is an officer.

"For that conduct public service is entitled to demand the highest standard.

"The maxim laid down for a court of law, that it is of fundamental importance not only that justice should be done in it, but that it should manifestly and undoubtedly be seen to be done, applies with equal force to the local government officer. Public confidence in his integrity would be shaken were the least suspicion, however ill-founded, to arise that he could be in any way influenced by improper motives.

"From this it follows that the local government officer, as a public servant, must not only be honest in fact, but must be beyond the reach of the suspicion of dishonesty.

"He is not to subordinate his duty to his private interests; or to put himself in a position where his duty and his private interests conflict. He should not make use of his official position to further those interests; but neither is he so to order his private affairs as to allow the suspicion to arise that a trust has been abused or a confidence betrayed.

"He should be courteous to all with whom his duties bring him in contact.

"The public expects from the local government officer a standard of integrity and conduct not only inflexible but fastidious. It is the duty of the service to see that the expectation is fulfilled."

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DURING the past seven years, Copper Service Pipe connected with STREAMLINE SOLDER FITTINGS has been installed in hundreds of communities throughout the United States and Canada, from corporation to curb stop and on into the building. We have never had a report where Solder Fittings failed or leaked in these installations.

STREAMLINE Fittings are not connected by threading or flaring the pipe, but by an entirely new and revolutionary method that utilizes nature's law, capillary attraction, to form one of the tightest and strongest joints known to the trade.

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STREAMLINE Copper Service Pipe represents one of the lowest cost forms of insurance that water works officials, who are responsible for the return on a heavy capital investment, can adopt.

STREAMLINE Solder Fittings and Copper Pipe are the most efficient materials for water works use, for general plumbing and heating, for many applications in filtration plants, in aeration lines and in heating coils using the sludge digestion system in sewage disposal plants.

When your city plans call for pipe and fittings for any purpose, consider STREAMLINE materials preferably before you buy. Send for Catalog W-3.

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During August we hope you will remember to mention THE AMERICAN CITY.

Housing and Planning Courses and Conferences

Columbia University Offers a New Housing Course, Open to Public

IN ADDITION to the courses offered by Columbia University to extension students, given in the Planning and Housing Division of the School of Architecture under the direction of Sir Raymond Unwin and Carl Feiss, a new course is offered this coming year in collaboration with the Department of Social Science of the University, in University Extension. The course is entiled, "Architecture ul81 - ul82—Housing. Applied problems in development and management." This will be open not only to students in the Political and Social Sciences, but to all people interested in housing. This course, so far as can be ascertained, is unique in this country. It will begin on October 4, 1939, and will be held on Wednesdays from 4 to 6 P.M. through both semesters. Experts in the social and administration fields of housing will be called upon to present detailed information under the direction of Carl Feiss, of the School of Architecture, who will act as coordinating officer.

Municipal League Sponsors Planning Conferences and Ordinances

DURING THE WEEK of June 12-17 the Kentucky Municipal League, with the cooperation and assistance of the American Society of Planning Officials, Chicago, conducted regional discussions of city planning and zoning in Paducah, Bowling Green, Paris, and Fort Thomas. Hugh R. Pomeroy, Director of the Virginia Planning Commission, formerly Chief of Field Service for the American Society of Planning Officials, completing the schedule made in his former capacity, addressed more than 300 city officials and representatives of civic groups at the four meetings in Kentucky.

Mr. Pomeroy's visit to Kentucky was arranged pursuant to the passage of legislation sponsored by the Kentucky Municipal League, during the 1938 session of the General Assembly, enabling cities of the third, fourth, fifth, and sixth classes to establish planning and zoning commissions. In each of the cities visited, a morning session was given over to a discussion of the problems of the particular city, and in the afternoon officials of neighboring ciites were invited in for a general discussion of the objectives, procedures, and technique of planning. Mr. Pomeroy was received with unusual enthusiasm, and since his visit the Kentucky Municipal League has complied with seven requests to submit suggested ordinances to provide for a planning commission, which are attributed directly to the discussions.

College of Architecture and Design, U. of M.

BY RECENT ACTION of the Board of Regents of the University of Michigan, the Department of Landscape Design has been transferred to the College of Architecture with the title of Department of Landscape Architecture. The Landscape Design faculty is transferred intact, Prof. H. O. Whittemore continuing as Chairman.

For some years, a survey course in housing has been given in the College of Architecture, and the design curriculum is so arranged that each architectural student works through a detailed study of a housing problem as part of his design sequence. In the five-year program in architecture now in effect, an advanced course in group planning will permit studies related to city planning.

In the Department of Landscape Design, courses have been offered in city and regional planning, and students have been permitted to major in this field. It is part of the program of the new combination of architecture and landscape architecture that the study of city planning may be further developed by closer coordination.

In recognition of the broader scope of the work now given in the College, the title of College of Architecture has been changed to College of Architecture and Design. Wells Bennett is Dean of the College.

City Manager Appointments

S. H. BOTHWELL, at present City Manager of Sweetwater, Texas, and formerly Manager of Longview, has been appointed City Manager of Fort Worth, Texas, to succeed Dudley L. Lewis.

James W. Aston, former Assistant Director of Finance of Dallas and at present City Manager of Bryan, Texas, has been appointed City Manager of Dallas, to succeed Hal Moseley. Mr. Aston will take office on August 1.

William H. Flower, coal and builders' supplies dealer, has been appointed City Manager of Ashtabula, Ohio, to succeed T. R. Bailey, who resigned to return to his former position as City Attorney.

John A. Gordon, former Mayor of the city of Barre, has been appointed first Manager of the town of Barre, Vt.

Lawrence F. McCusky, of Middleboro, Mass., has been appointed first City Manager of Killingly, Conn.

Steve Matthews has succeeded C. Alexander as City Manager of Borger, Texas.

Ralph E. Smyre, former County Register of Deeds, has been appointed City Manager of Hickory, N. C., to replace R. L. Hefner.

Carl W. Wright, head of an auditing firm bearing his name, and a resident of Ridgefield, N. J., has been appointed City Manager of Hackensack, N. J., to fill the vacancy created by Wilder M. Rich's resignation.

CLARENCE E. RIDLEY,
Executive Director, International City Managers' Association.

The Municipal Bond Market

Recent sales of new issues from July numbers of *The Bond Buyer*:

Amount	Borrower and Purpose	Rate (%)	Term (Years)	Basis (%)
$ 285,000	Westchester Co., N. Y., Home Relief	.75	2-33 Avg.	.72
211,000	Watertown, N. Y., Public Welfare	1	5-33 Avg.	.99
150,000	Somerville, Mass., Municipal Relief	1.25	1-10 Ser.	1.22
200,000	Columbia, S. C., Certificates of Indebtedness	1.25	1.25 Avg.	1.23
135,000	Newport, R. I., Storm Rehabilitation	1.75	9.25 Avg.	1.59
200,000	Indianapolis, Ind., School City	1.75	11.16 Avg.	1.65
512,000	Waterloo, Ia., Sewer Outlet and Purifying Plant	1.75	11.25 Avg.	1.67
275,000	Rock Island, Ill., City Hall	2.5	10.16 Avg.	1.72
112,000	Port Arthur, Texas, Street Improvement Refunding	1.75	3 Avg.	1.75
125,000	Houston, Texas, Airport Warrants	4	5.25 Avg.	1.87
1,400,000	Providence, R. I., Rehabilitation of Hurricane Damage	2	6-25 Ser.	1.97
251,000	Paterson, N. J., School and Refunding	2.5	5.5 Avg.	2.36
111,000	Flint, Mich., Water-Works Improvement	4.5	10 Avg.	2.49

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The 2 plane contact (45° plus 90°). This point provides great mechanical strength and resistance to pull, twist and vibrations. It is available by adapter to any style of Corporation or Curb Stop.

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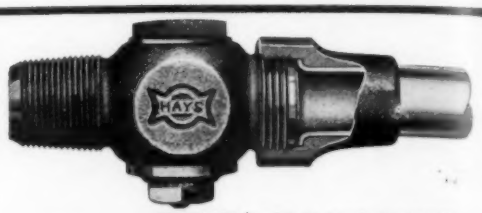
Note the right angle or 90° flange. This joint provides greater holding strength than the common 45° compression joint. It is available directly on all styles of corporation stops made by Hays.

HAYS "90" SEALS

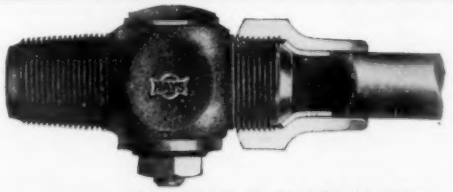


STRAIGHT, ⅛ OR ¼ BEND ADAPTERS

Adapt to

Note the spherically shaped seat. It noses into the 45° flange of the copper pipe to make a large area contact. Available on all types of Hays corporation stops and copper service fittings.

HAYS RADIUS SEALS



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3 TYPES of COPPER PIPE CONNECTIONS

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Watching the water level in a distant storage tank and automatically holding this level always between the safe high and low limits is a job which the Park Department of the City of Los Angeles is now successfully doing by means of a Bristol's Metameter.

The installation consists of the transmitter at the storage tank which transmits continuously, accurately, instantly water level readings to the receiver located at the pumping station two miles away. This receiver records every change in level. It also controls the pump motor.

For installation details and further information, write for Bulletin 51-55.

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Gauges, Air Valves and other Water Works Services. Manufacturers of Meters and Controllers of the Venturi Type

Improving Municipal Administration

Current Items from the Public Administration Clearing House

Winchester, Mass., Prepares Long-Range Public Works Program

A SIX-YEAR program of public works construction has been prepared by Winchester, Mass., the American Public Works Association reports. The program establishes a tentative schedule for the construction of public improvements for six years in advance, on a basis of estimated community needs and revenues.

Priorities of projects, estimates of cost and probable future revenues were determined by town officials and the Town Planning Board. Estimated amounts available for capital improvements vary from year to year—for example, $247,996 is scheduled for 1939 and $209,049 for 1940.

The Winchester program, planned with assistance of the National Resources Committee, the PWA and WPA, was prepared as part of a study to determine the most desirable procedure for setting up such a public works program.

Eight Principles of Municipal Purchasing Shown in Survey

ALTHOUGH there is no single or "model" pattern for the organization and administration of a municipal purchasing department, there are at least eight principles which make for the success of such a centralized office, the Public Administration Service said in a report last month. The eight principles are:

1. Centralized authority over purchasing
2. Maintenance of competent purchasing personnel
3. Development of standards and specifications to assure the quality of goods purchased
4. Consolidation of departmental requirements into quantity purchases to obtain lower prices
5. Stimulation of active competition among bidders
6. Inspection and testing of goods delivered to enforce compliance with specifications and terms of orders
7. Control over goods in storage
8. Control over salvage.

Industry, more than 30 years ago, solved its purchasing problems by the employment of specially qualified purchasing agents to exercise authority over all buying activities. This plan proved so efficient and economical that it has been adopted by over 200 cities in the United States and Canada.

In the majority of small cities, however, purchasing still is the function of the individual department heads, according to the report. Nevertheless, small cities can use some of the techniques of centralized purchasing even though unwilling or unable to adopt complete centralization.

The first step in the establishment of a satisfactory municipal purchasing plan is to fix responsibility for purchasing on a single officer or agency, and to define the scope of that responsibility and the manner of its exercise. Once authority is established, other phases of centralized purchasing may be worked out according to the best interests of the municipality.

Experience has shown that a satisfactory centralized purchasing procedure can save a municipality from 10 to 15 per cent on expenditures for commodities, the report says. Such a saving may be even greater in small cities because of the higher unit prices occasioned by small purchases and by dealing only with local merchants.

City Employees May Participate in State Retirement System

CALIFORNIA, with approval by its Legislature this year, has become the fourth state in which employees of local governments may participate in the state employees' retirement system, the Municipal Finance Officers' Association of the United States and Canada reports. New York, New Jersey and Ohio are the other states in which such participation is permitted.

In addition to California's action in this field, North Carolina's Legislature this year voted approval of a state-wide retirement plan for the benefit of local employees. This plan, unlike California's was not created originally for state employees, and they will not participate. Wisconsin is considering legislation similar to North Carolina's, and Illinois has a state-wide retirement system which applies only to public utility employees, the Association said.

Under the various state retirement systems for municipal employee participation, both the employee and the municipality for which he works contribute, usually in equal amounts. The same age and length-of-service retirement standards applying to state employees usually apply to city employees. In most cases, arrangements are made under which employees who worked for the city before it became a member of the state retirement system may receive benefits from the date of their initial employment.

Strict Bicycle Regulations Passed by Cities to Curb Accidents

IN AN EFFORT to check rising death and injury rates accompanying the revival of bicycling as a sport, municipalities in growing numbers are enacting more stringent laws regulating both bicycle and rider, the International Association of Chiefs of Police reports.

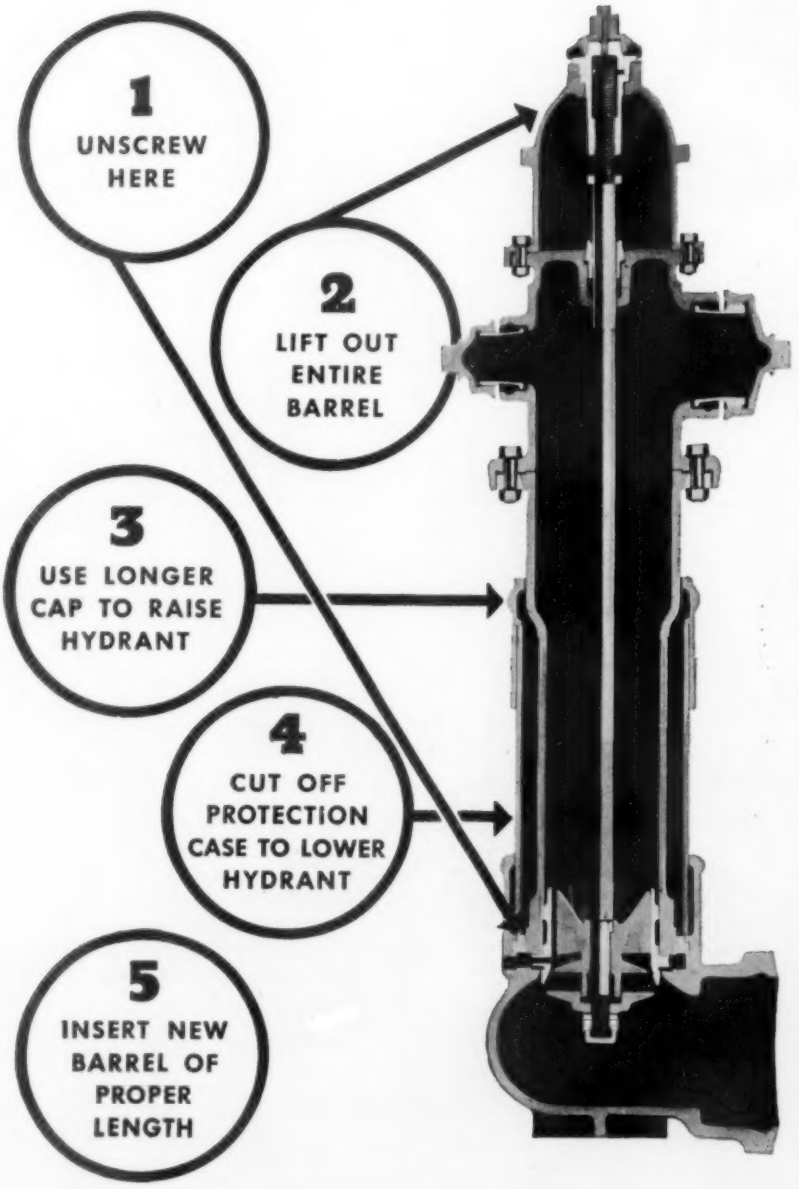
Strict laws enacted as safety measures this year by four cities—Wilmette, Ill., Cleveland, Ohio, Buffalo, N. Y., and Tacoma, Wash.—not only require registration of bicycles with the police, but specify inspections to check brakes, headlights and taillights. Riders must pass examinations on traffic rules and ability to ride.

In addition, about 14 cities approved comparable bicycle regulation laws within the last year, including Dayton, Ohio, Duluth, Minn., and Chicago and Waukegan, Ill. Many other cities have less strict regulation.

Wilmette's new law, similar to those of Cleveland, Buffalo and Tacoma, is considered one of the most satisfactory as to regulation and safety. Designed to curb accidents by prohibiting operation of bicycles on congested streets and highways, it requires that bicycles be equipped with a horn or bell, a headlight visible at night for at least 200 feet, and a red reflector on the rear fender. Wilmette bicyclists must observe all traffic rules and, if traveling in a group, must ride in single file. Extra riders are prohibited. The chief of police may suspend or revoke licenses, and assess fines of $1 to $200.

The passage of more stringent bicycle regulations, and their enforcement, should cause decrease in bicycle accidents, which in the last two years resulted in 1,500 deaths and 70,000 injuries, the Association says. These figures more than triple death and injury figures for 1932, when bicycle riding became more popular.

Mathews Hydrants Meet New Street Levels Without Digging



You never expect to move that hydrant, once it's set. Yet some day you may find yourself in the middle of a grade-changing job and that hydrant half-buried or sticking out like a sore thumb. It must be raised or lowered —quickly, cheaply, and, if possible, without digging.

Install Mathews Hydrants now. Then you'll never have to dig. All you need do is unscrew and remove the barrel, cut the protection case down to the ground level (or use a *longer* cap to build it up), and insert a new barrel. In half an hour your job is done!

Mathews barrels are made in various lengths to meet just such conditions. They are completely interchangeable. You need not impair fire protection because the hydrant is out of service only during the few minutes that the barrel is being changed. Another method for raising nozzles is to use the conventional extension piece between the elbow and the barrel. With this method the same barrel and protection case are used. Be on the safe side for any emergency. Write for details about Mathews, the hydrant you change like a tire.

MATHEWS HYDRANTS

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Manufacturers of Sand Spun Pipe (centrifugally cast in sand molds) and R. D. Wood heavy-duty gate valves for water works

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Traffic Control and Facilitation

Conducted by Publications Committee, Institute of Traffic Engineers, 60 John St., New York

Paul L. Green, Chairman; George W. Barton, William C. Brandes, Edward H. Eames, Ralph W. Eaton, William G. Eliot, III, James R. Guthrie, Harry C. Koch, E. B. Lefferts, Miller McClintock, William R. McConochie, Theodore W. Matson, Robert A. Mitchell, John B. Moriarty, William A. Van Duzer, Ralph F. Michel

Signal Discourages Speed at Crossroads

By Edward H. Eames
Traffic Engineer, Automatic Signal Corporation

THE Maryland State Roads Commission has recently inaugurated a new traffic-signal system combining automatic speed control and traffic control at a highway intersection. The new signal is installed at Harford and Joppa Roads, at Carney, Md., and not only assigns separate right-of-way periods for these two intersecting roads but also sets up an automatic control of speed of traffic approaching the intersection.

Coordinated Intersection Signal and Speed Control, Carney, Md.

The speed-control feature is obtained by normally displaying red signals to all sides of the intersection in the absence of traffic and introducing a special time delay before the red signal changes to green on either road in response to the approach of traffic there. An approaching car is detected at some distance from the intersection, and the time delay period corresponds with the time it should take the car to travel from the point of detection to the intersection at a reasonable speed. If the car is approaching at too high a speed, it is required to slow down to a speed lower than average; and if the speed of approach is quite excessive, the traffic will have to come to a complete stop before entering the intersection. If the approaching car is traveling below the critical speed established by the system, the signal will change from red to green just before the car reaches the intersection, in the absence of cross traffic. However, if cross traffic is present, the approaching car referred to will have to come to a stop in the usual fashion and wait for a further period for the signal to change in its favor. This speed-control feature has in effect been added to a standard traffic-actuated control signal in the new system.

At the intersection where the system is under test by the Maryland Roads Commission at the present time, considerable difficulty had been experienced prior to the signal installation due to the tendency of traffic to travel along the highway at too fast a speed for the conditions present at this intersection, and the State Roads Commission desired to test out the possibilities of adding an automatic speed-control feature to a traffic-actuated signal under consideration for the intersection. The intersection had not previously been signalized, and since the signal under consideration involved the installation of traffic detectors on the approaches to the intersection, the addition of the speed-control feature required only the addition of extra timing and control equipment in connection with the usual traffic-actuated signal timing mechanism.

The Roads Commission has already had some favorable experience with speed-control signals installed on the highway between Baltimore and Wilmington. These earlier speed-control signals also involved the principle of a normally red signal with a time delay matched against the time it would take a car to travel at a predetermined reasonable speed over a predetermined distance immediately in advance of the signal, but the earlier signals were then installed alongside the highway near a dangerous underpass where there was no intersecting roadway. At this earlier speed-control point, therefore, it was not necessary to alternate the right-of-way between two intersecting roadways. These highway speed-control signals had great success in reducing the speed of traffic approaching the signal along the highway and brought a corresponding accident reduction at the nearby danger points for which the signal was provided.

With the problem in mind of signalizing the intersection of Harford and Joppa Roads, the State Roads Commission decided to test a combination of the speed-control features with a standard traffic-actuated signal system, and the combined system was installed. Like many other intersections of this type, the main highway has considerably more traffic and higher speed traffic than the cross road. In order to provide the fullest effect of the automatic speed-control feature desired, the north and south approaches of the highway are given independent control of signals facing these approaches. The north signal can be changed from red to green by traffic on the north approach while the south signal remains red in the absence of traffic on the south approach. Similarly, the south signal can be changed from red to green by traffic on the south approach, or if cars happen to be approaching on both north and south sides of the intersection, both

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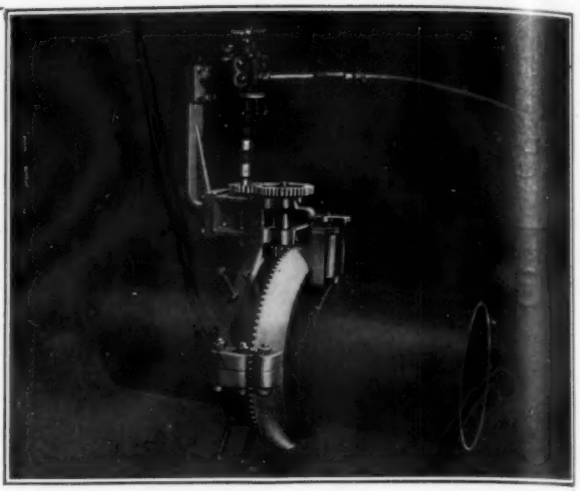

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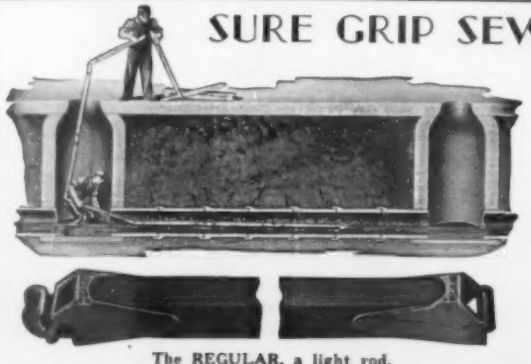
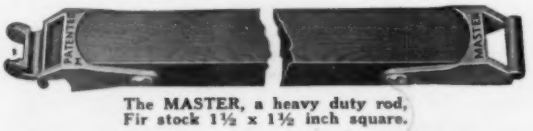


The REGULAR, a light rod,
Fir stock 1¼ x 1¼ inch square.

are joined together with a dual lock forming a rigid chain that will float. They can be coupled or uncoupled upon the street if desired. Made in two sizes.



The MASTER, a heavy duty rod,
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north and south signals may change to green concurrently.

The speed-control feature is primarily desired and has its greatest advantage upon the arrival of an individual car considerably spaced from other traffic, for it is under such conditions that a car is most likely to be traveling at an unreasonably high speed. Thus with the combination system at Harford and Joppa Roads, in the absence of traffic on the cross road all the signals display red. If a car should then approach on the south side of the highway, the car will actuate a traffic detector some 150 feet from the intersection, and the south signal only will change from red to green directly after a few seconds delay, which will require the car to stop or slow down if it is going too fast. The green signal remains displayed for a few seconds, and then in the absence of following cars on the south approach the signal returns directly from green to red. If additional cars approach on the south during the display of the green signal, however, such cars will prolong the green signal until the last car has passed, after which the signal will revert to red as before. Since the operation of the signal requires that the first car be proceeding at a reasonable speed, the following cars (which must be closely spaced in order to hold the green signal) must also be traveling at reasonable speed. Cars approaching on the north are similarly treated independently of the south approach, but both the north and south approaches can receive the green signal only during the time period in the signal cycle which would ordinarily be assigned for the right-of-way on the highway, or in the absence of cross traffic.

If a car arrives on the cross road while there is no closely approaching traffic on the highway, the cross-road car will arrive with all the signals red and the cross-road signal only will change directly from red to green after a brief time delay, which can be similarly used to require a reasonable speed on the part of this cross-road car. The signal remains green on the cross road for the usual minimum period and subject to extension by closely following cars, and reverts to red through the usual amber clearance period after the passage of the last cross-road car or at the end of the maximum time limit if the cross-road traffic continues up to this limit.

While the signal is green on the cross road, a red signal is maintained on both the north and south approaches of the highway, and any cars approaching on the highway are required to wait for the return of the green signal to the highway in the usual fashion, after the end of the cross-road right-of-way period. At the end of this period, if there is traffic waiting on the highway, on both the north and south approaches for example, both the north and south signals will promptly change from red to green and remain green for a brief minimum period, but subject to extension by following cars on the highway, returning to red on each approach independently as the last approaching car clears.

Under the various operating conditions just described it will be observed that there is no display of an amber signal on the highway, since each car is given sufficient time to clear before the green light changes to red. However, in case cars are sufficiently closely spaced, on either the north or the south approach or both, to be maintaining a green signal continuously, and a car arrives on the cross road, then a maximum time limit will be established by the arrival of the cross-road car so that the green signal cannot be held indefinitely on the highway; and also in such event if the highway traffic continues to hold the green signal up to the maximum time limit so established, an amber signal period will automatically be introduced and the signals will change from green through amber to red, on such maximum limit.

Although the system presents a more complicated operating cycle for the signal than is usual at signalized intersections, particularly in the separate control of the north and south approaches of the highway, the test so far has indicated that this presents no difficulty to the highway traffic, and the system offers opportunity for an automatic control of speed at intersections where the traffic has a tendency to travel at excessive speed.

One-Way Streets

Increase traffic flow without increasing accident ratio and thus relieve rush-hour congestion, as well as simplify turning, permit milder parking regulations and avoid street widening

By W. A. Van Duzer
Director of Vehicles and Traffic,
Washington, D. C.

THE one-way streets in the District of Columbia may conveniently be separated into:

A. *Full-time one-way streets*
   (1) Minor streets (light traffic)
   (2) Important streets
B. *Rush-hour one-way streets*
   (1) One-way (7-9:30 A.M. and 4-6 P.M.)
   (2) One-way (4-6 P.M. only)
   (3) One-way (7-9:30 A.M. only)

Under the above grouping are found 17.3 miles of A (1), 16.7 miles of A (2), 7.9 miles of B (1), 5 miles of B (2), and 0.1 mile of B (3) streets. Since there are 731.5 miles of improved streets in the District of Columbia, the one-way groups total about 47 miles.

The minor streets are each only a few blocks long and have mainly been made one-way because they were too narrow for safe two-way operation. If necessary, adjacent streets are made alternately one-way. Also under this heading are included short stretches in various parts of the city that have been made one-way to facilitate traffic control at signalized intersections.

The important streets that have been put under full-time one-way operation vary from 7 to 21 blocks in length. These are so arranged that neighboring streets have alternate one-way movement. In most cases adjacent streets alternate, while in others a two-way street is left between the one-way streets.

The rush-hour one-way streets have been instituted to take care of the heavy directional flow into the central business district in the morning (7-9:30) and out of it in the evening (4-6). Thus in the evening, 10 per cent more cars are leaving than are entering. In the morning 18 per cent more cars are entering than are leaving. The total traffic is substantially the same morning and evening. This peak traffic period is shorter in the morning than in the afternoon. Extra streets are made one-way out of the central district during the evening rush hours to take care of special areas which become congested during those hours. These rush-hour one-way streets are spaced so as to cover the congested district at intervals of five or six blocks.

Special parking restrictions are in force on one-way rush-hour streets so as to take parking off the side of the street opposite the normal direction of traffic flow. This restriction has always been applied regardless of other

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FOR TEN YEARS

before offering to Engineers

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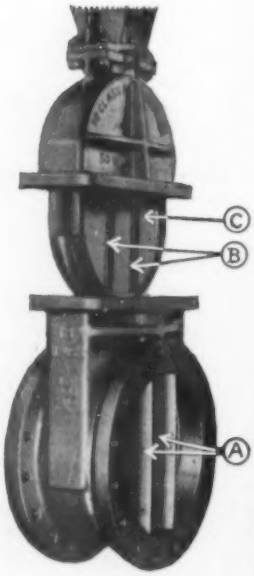
BEAMED WATERWAY GATE VALVES

These valves were developed for use as "wash water" valves, the primary objectives being to find the valve best suited for hydraulic operation, and to eliminate troubles involved in using double disc, parallel seated gate valves under throttling conditions.



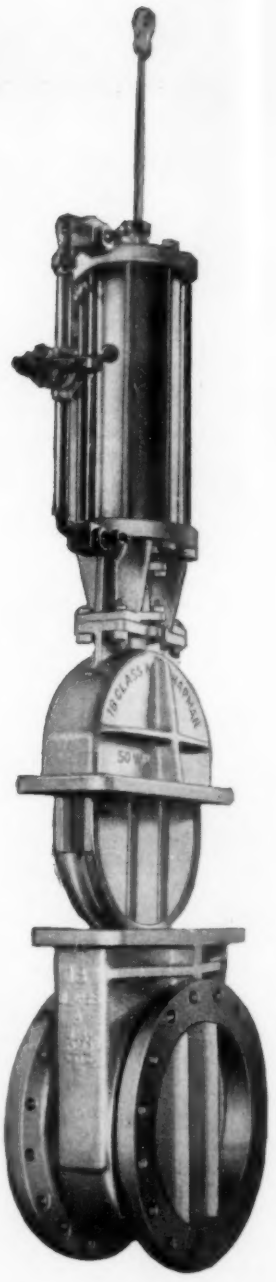
Chapman valves of the "beamed waterway" type have been in service about ten years as wash water valves in Water Filtration Plants. Reports and leak tests evidence their marked superiority over both the conventional type and the "square bottom" gates for this type of service.

Important Features

Vertical "beams" (A) in downstream port prevent "tipping" of disc into waterway and uneven wear on rings.

Bronze stripe (B) on downstream disc bear on bronze facing of beams in same plane as faces of seat and disc rings (C).

Bearing contact between disc and body seat facings are *six* to *ten* times more than in conventional type when valve is one-quarter or one-half open.



BEAMED WATERWAY TYPE
18" Class A Chapman Gate Valve
Equipped for operation by air

BEAMED WATERWAY GATE VALVES are now available in all sizes of Class AA, A, B and C gate valves. We recommend them for dependability and longer life under "wash water" service conditions.

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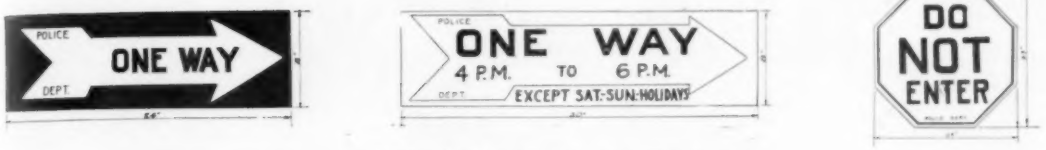


Three Markings Used on One-Way Streets

parking regulations. If the volume of traffic necessitates, parking is also taken off the other side of such streets. No important parking restrictions that can be ascribed solely to their one-way operation have been placed on the full-time one-way streets.

Directions Pay

All one-way streets are well marked by directional arrow signs with suitable wording (including the time during which one-way operation is in force), as shown. "Do Not Enter" signs are used wherever necessary along those streets that are one-way at all times. An extensive check shows that there are fewer than 1 per cent of violations of the one-way regulation on the rush-hour streets. This confirms adequate marking of such streets, or good enforcement, or both.

An experimental set-up of a pair of special rush-hour one-way signs (known here as triple offset system) has been in satisfactory operation at 6th and E Streets, N. W., since August, 1937. These signs are made up of neon tubing composing the words ONE WAY with directional flashing arrows superimposed thereon. The signs are connected to a seven-day time-switch and flasher which turns them on week-days during the rush hours. At the same time the correct directional arrow (south in the morning, north in the evening) is made to flash on and off continuously. The neon tubing and associated equipment are in a sheet-metal cabinet attached to the traffic-signal pole immediately below the traffic signal proper. These signals are used in conjunction with the triple offset circuit employed along 6th Street, N. W.

Since 6th Street, N. W., is typical of the rush-hour one-way streets in the District, an analysis of the effect of one-way operation on this street will be given as the concluding section of this article. In addition, this street uses a triple offset system of signals along most of the one-way section. The section of 6th Street using the triple offset comprises fifteen signalized intersections with the offset installed at six of these. The same speed is maintained by the signals as before the offset was installed, but the through band width has been increased from 20 to 35 seconds out of a total cycle of 80 seconds.

TRAFFIC COUNTS ON THREE PARALLEL STREETS

Date	Time	Type of Operation	Traffic Along Street and Direction		
			North	South	Total
6TH STREET					
March, 1935	8-9:30 A. M.	Two-way	393	770	1,163
June, 1935	"	One-way		1,165	
Jan., 1938	"	Triple offset		1,326	
March, 1935	4-6 P. M.	Two-way	1,097	535	1,632
June, 1935	"	One-way	1,537		
Jan., 1938	"	Triple offset	1,724		
Two-Way 5TH STREET					
April, 1935	8-9:30 A. M.		412	448	860
March, 1938	"		500	467	967
April, 1935	4-6 P. M.		720	375	1,095
March, 1938	"		801	858	1,659
Two-Way 7TH STREET					
Feb., 1935	8-9:30 A. M.		356	620	976
Aug., 1935	"		446	615	1,061
March, 1938	"		450	450	900
Feb., 1935	4-6 P. M.		780	685	1,465
Aug., 1935	"		600	886	1,486
March, 1938	"		640	733	1,373

This street was put under one-way operation on May 5, 1935, and the triple offset was installed in August, 1937. The following counts are average ones (along the streets indicated) taken at such times as to show the effect of the above changes both on 6th Street and on the adjacent streets on either side. These counts have been corrected for the city-wide increase in traffic so as to make the counts taken in various years more nearly comparable. Inadequate counts for the period 7 to 8 A. M. have not been included.

From the above tabulation it is seen that:

(1) One-way operation has had little effect on the total traffic carried by 6th Street during rush hours.

(2) The installation of the triple offset has resulted in an increase in traffic carried averaging 13.0 per cent over that before the offset was installed.

(3) One-way operation has brought about an increase in southbound traffic during the morning rush hours, from 770 to 1,165, or 51.4 per cent.

(4) One-way operation has brought about an increase in northbound traffic during the evening rush hours, from 1,097 to 1,537, or 40 per cent.

(5) The total traffic has increased on the adjacent streets (5th and 7th) an average of 10.1 per cent in the morning, and 26.0 per cent in the evening. The major portion of this increase was in a direction opposite to that in which 6th Street was one-way.

(6) The installation of the triple offset on 6th Street has actually decreased the total traffic on adjacent 7th Street an average of 11.4 per cent during rush hours.

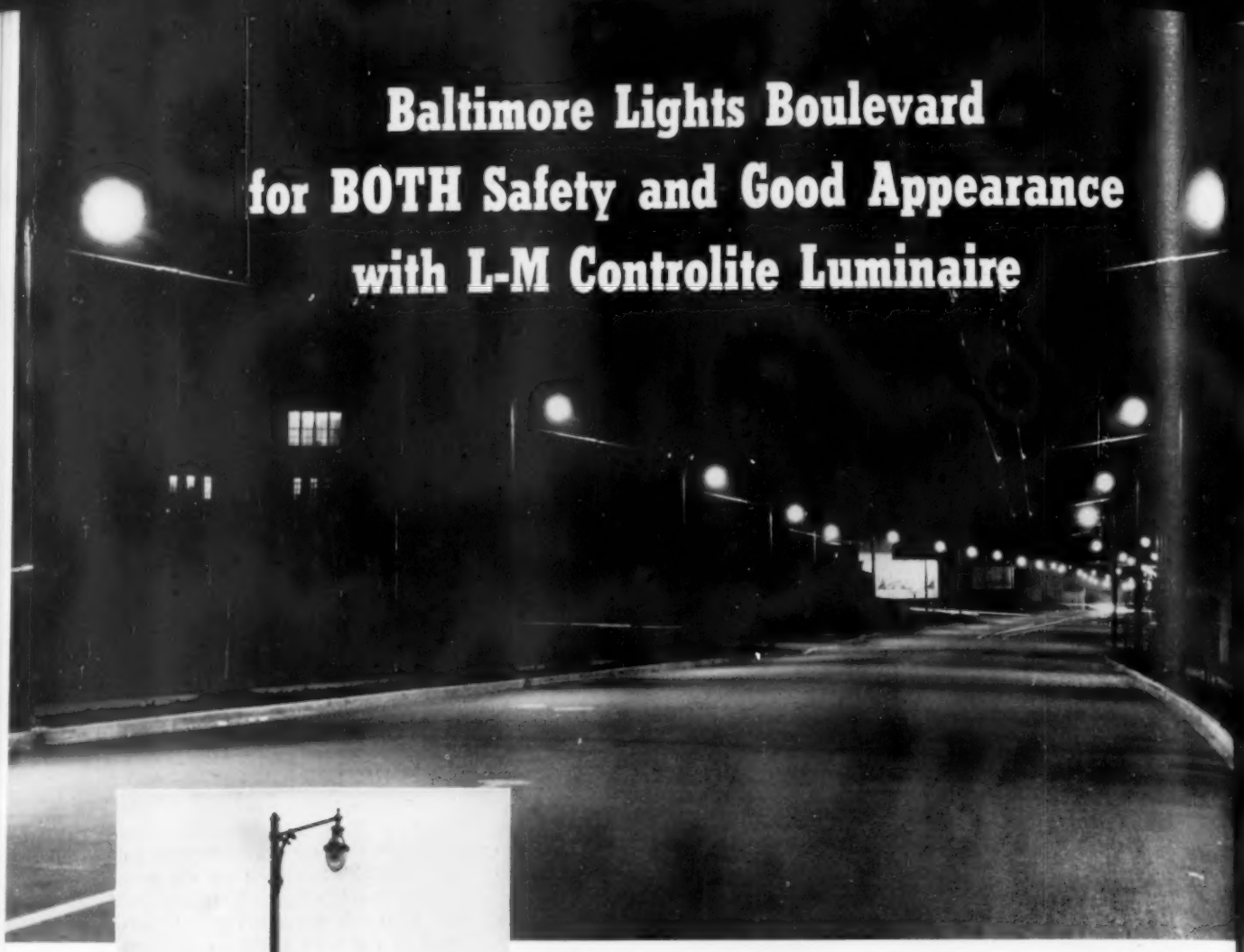
The following table shows that the installation of one-way operation on 6th Street has had no outstanding effect either on the number or the nature of the accidents along this street. Rear-end collisions doubled, and accidents due to one car turning (with cars going in opposite directions) dropped from 5 to 2. The two head-on collisions were due to out-of-town cars violating the one-way restriction. Nevertheless, the increased number of cars carried by the one-way system, with little or no accident increase, amply justifies the use of one-way streets.

ACCIDENTS ALONG 6TH STREET (8-9:30 A. M. AND 4-6 P. M.) DURING TWO YEARS BEFORE AND TWO YEARS AFTER ONE-WAY OPERATION

Type of Accident	1933-35	1935-37
Pedestrian	11	12
Rear-end	3	6
Right angle	8	10
Side-swipe	3	3
One car turning (cars going in opposite directions)	5	2
Turning from wrong lane	2	2
Head-on	0	2
Total	32	37
* Total	32	*34

* Corrected for increase in traffic.

Baltimore Lights Boulevard for BOTH Safety and Good Appearance with L-M Controlite Luminaire



Maximum Visibility for safety . . . distinctive design for good appearance . . . with these twin objectives Baltimore officials planned the lighting of newly extended, heavily traveled Howard Street. As the lighting unit combining these qualities they chose the L-M Controlite Luminaire mounted on L-M Monotube Standards.

The photographs show the highly successful result. Note the even distribution of light over the entire pavement, the near-daylight visibility, the absence of glare. Note, in the smaller photo, the smart appearance of this modern standard and luminaire. Here is visual evidence of how well the L-M Controlite can solve *your* boulevard lighting problem. Ask your L-M representative, or write to South Milwaukee, Wis., for full information on the complete line of L-M Outdoor Lighting Equipment.

LINE MATERIAL CO.

Outdoor Lighting

Streets—Highways—Floodlighting

Old *New*
Lighting Units

Niagara Falls Brightens at Negligible Cost

By Rob Roy MacLeod
Vice-President,
Buffalo Niagara Electric
Corporation

At Right—City Manager W. D. Robbins, J. E. Costello and C. H. Anderson of Buffalo Niagara Electric Corp., and Adin W. Chase, City Electrician, looking at big luminaire

A NEW controlled incandescent street-lighting system in the business district of the city of Niagara Falls, N. Y.—within constant earshot of the great cataract which lights the lamps of a thousand cities and towns—has placed these streets among the best-illuminated in the world.

Switched on this year by Mayor W. Levell Draper, the new improved installation replaces a magnetite-arc system, which for many years was considered to be the finest in the country. Buffalo Niagara Electric Corporation engineers and Adin W. Chase, City Electrician, who cooperated on the survey which resulted in the new incandescent lighting, consider today that the streets in the business area of the city are the best-lighted in the world.

The new program of illumination covers 8.3 miles of main and secondary business streets and 15 miles of residential thoroughfares, all changed over from arc lamps to the controlled incandescents which are focused like an automobile headlight. This scientific light control directs the illumination to the pavement, where lighting is needed, and prevents the light from being wasted skyward.

The former type lamps bathed the streets in approximately 15,000,000 lumens of light as compared with the brilliance of 20,000,000 lumens cast by the new incandescents. Engineers point out, however, that the efficiency of the new system is greater than expressed by these figures, because in former lighting systems much of their illuminating power was diffused in an upward direction.

And cost to the city of Niagara Falls

Modern Lighting on Main Street, Niagara Falls, N. Y.

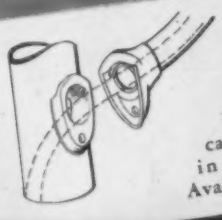
New Lighting on a Secondary Street, Niagara Falls

IS YOUR STREET LIGHTING DESIGNED FOR "Model T" TRAFFIC?

• Like the famous Model T, the street lighting standard at the left was outstanding in its day. But times have changed. Both the speed and volume of traffic have increased. The street lighting system of yesterday is inadequate for today's needs and stands as a constant threat to community safety.

The standard at the right typifies modern street lighting at its best. The long, tapered Union Metal *steel* standard places the high intensity luminaire at a height almost twice that of the old style cluster lights, as well as farther out over the street. It is this combination which provides increased visibility for the safety of both motorist and pedestrian.

Union Metal offers a complete line of steel standards for street and bridge lighting. Write today for information on our free engineering service.



SIMPLEX ARM ATTACHMENT
An Exclusive Union Metal Feature
Easy to assemble and wire. Protects and supports cable. Holds bracket arm in positive position. Available at no extra cost.

UNION METAL

THE UNION METAL MANUFACTURING CO. CANTON OHIO

for the new lighting is negligible, they add, because the new system effects an appreciable saving in operating costs to the power company, a saving which is passed along to the municipality in terms of more light.

In all, 1,023 arc lights were replaced by incandescents. The old arcs were 6.6- and 4.4-ampere magnetite arcs, and they gave way to 6,000-, 10,000- and 15,000-lumen incandescents.

The city of Niagara Falls enjoyed additional welcome savings through modernizing the old trolley poles, which carried the arc lamps, for the new fixtures. The arcs cast their light from the poles at a mounting height of 17 feet. When the old lights were removed, the incandescent fixtures were moved up to a height of 22½ feet, assuring greater lighting efficiency. The new decorative brackets, which bear the new fixtures, are surmounted on the pole by a decorative cap. The system is served by a single overhead conductor, barely visible from the street and much cheaper than underground cable service—the city getting a lot more lighting for every dollar.

The new system is switched on every evening automatically through use of photoelectric cells designed to turn on the lights when the level of daylight diminishes to a certain point. The city owns poles and brackets; the electric company luminaires and circuits.

Modern Street Lighting in 10 Easy Lessons

MANY of the 29,832 street-lighted communities sense that their night appearance and safety ought to be improved. They have observed results in municipalities which have done it. They read that a whole new science of outdoor lighting has developed, and it sounds expensive. What are the facts about modern street-lighting practice?

In the famous tropical hurricane which swept the East last September even the ocean seemed to know that from an efficiency point of view the upright street lamp is outmoded. However, the type has a certain grace and dignity, and it showed the ocean that it also has tenacity—the glassware as well as the standards

— 1 —

Principles as old as time are now being applied. As long as there has been fire it has been known that the heat and the light radiate in all directions —up as well as sideways and down. Yet, for generations, street lamps stuck up in the air like torches, lighting the heavens as well as the road. They still do, in many of the most progressive municipalities; but illuminating engineers now know that the lamp that hangs down and is capped by a reflector which throws the upward light down onto the roadway is two or three times as efficient as the upright fixture. Consequently, the modern luminaires are of the pendant type and are fitted with efficient reflectors such as those made of aluminum.

— 2 —

Even when practically all the light is reflected downward, there is still wastage unless refractors are employed to bunch all the light onto the roadway. Street light straying over on porch, lawn and sidewalk is wasted light. Twenty years ago prismatic glass refractors were designed to utilize all the light possible. Through that long period they have been available to those having the good sense and public consciousness to make use of them. But because they increase the first cost of a lighting unit by 5 per cent, they have too frequently been omitted, or "something just as good" has been substituted for the real thing. Modern equipment makes increasing use of this device, however, in all regions where light conservation is desirable, with further increase in efficiency, resulting in three or sometimes four times as much light on the street as was provided by the outmoded equipment of an era of farm wagons instead of automobiles.

— 3 —

Nor are efficiency and economy the only results of the application of this first basic principle that lost light recovered is more light for the same money. Glare has been vastly reduced, and night driving thus made more agreeable as well as less hazardous.

— 4 —

A contributing factor in the reduction of glare has been the steady increase in the heights at which the luminaires are mounted — 22½ feet being present good practice, with greater heights in prospect. This tendency naturally requires that intelligent attention be given to the size of the lamps and the distance between lighting units.

— 5 —

Normally, a material increase in mounting height, as from 14 feet to 22½ feet, would require a considerable increase in wattage. It happens, however, that in designing a modern in-

It Happened One Night!

WHEN the sun goes down, Public Safety goes on the spot. The number of fatal accidents at night is rapidly increasing. Crime, too, lurks in the dark. Fire threatens.

Yet the cost of modern Public Safety equipment is only a tiny fraction of the losses in life and property it would prevent.

Furthermore, such equipment—as well as experienced advice—is conveniently and completely available from a single source, Graybar. It assures you *dependable* equipment . . . Union Metal Street Lighting Standards . . . G. E. Novalux Street Lighting . . . Horni Fire-Alarm systems . . . Western Electric police radio . . . Karpark parking meters . . . modern traffic control. Write us for information!

Graybar

OFFICES IN 83 PRINCIPAL CITIES, EXECUTIVE OFFICES, GRAYBAR BLDG., NEW YORK

THIS ADVERTISEMENT REPEATED BY REQUEST

PUBLIC SAFETY EQUIPMENT DISTRIBUTED BY GRAYBAR:

stallation considerably larger lamps are likely to be used anyway, because they are much more efficient and economical than small lamps, as graphically shown on page 500 of the 1938 edition of THE MUNICIPAL INDEX.

— 6 —

The successful modern system not only salvages much light that formerly was wasted, but uses larger lamps in order to provide a different character of street lighting than got by in the past. The lighting of Niagara Falls, N. Y., and Greensburg, Pa., for instance, seems lavish—because one instinctively compares it with the inadequate. Throughout the country, cities are relighting, and more and more the modern lighting in one city will be compared with modern lighting in another city.

— 7 —

The informed municipal official will not only insist on modern luminaires at proper height and spacing, but will see that the daytime appearance of the new installation is an addition and not a subtraction.

A modern egg-shaped (streamlined) luminaire hanging from an unsightly arm extending from a gray weather-worn wooden pole will fail to win full public approbation. Nor is a cast iron monument necessary. The ideal standard is the one that is least visible, yet when seen is found to be graceful and appropriate. Such standards are readily available at reasonable cost. Where it is necessary to continue the use of existing poles, an attractive steel bracket such as Niagara Falls designed will add to daytime appearance.

— 8 —

Year by year, car registrations have increased, buses have become the means of intercity mass transportation, trucks have become the intercity freighters, automobiles are vacation and holiday vehicles. Municipalities recognize that they must speed the buses and trucks safely through their highway streets, must light up the arteries. Why not also light up the business district in a way to warm the hearts in the automobiles? In thus adding to the attractiveness and prosperity of the district, still more cars will be drawn from nearby countryside and towns, local residents will come out to see the sights, and all at once here is a progressive community.

— 9 —

Not only in a general relighting program, but in any study of night conditions and hazards, the advantages of using special methods of lighting must be considered. For the highway, including through streets, sodium-vapor lighting has steadily increased in popularity. The fact that it is immediately thought of in connection with grade crossings and dangerous intersections, is a compliment to its effectiveness. For ornamental lighting of civic centers—as in Oklahoma City and Fort Smith, Ark.,—and in entire communities—as in Belmont, Mass., and Wendell, Idaho—the mercury-incandescent lamp merits an attentive hearing. Sodium vapor and mercury vapor are the new discoveries in street lighting. Much more economical users of electric energy than the tried and venerable incandescent, they await broader recognition and greater volume in order to be cheaper in first cost as well as in operation.

— 10 —

Modern street lighting, therefore, is not at all hard to comprehend. It results from using the properly engineered and up-to-date equipment which is now available.

One of Nine Sodium-Lighted Zones in St. Louis

Sodium Light Shows Danger and Divider

SODIUM-VAPOR lighting is serving a dual purpose on nine safety-zone traffic dividers in St. Louis streets. This cautionary light not only warns the motorist of a danger zone and reveals the traffic divider, but also illuminates street-car loading zones and roadway adjacent to the dividers.

A typical traffic divider consists of a cone-shaped concrete base on which is mounted a 4-inch pipe 11 feet 5 inches high. Atop this pipe, previous lighting facilities consisted of a traffic beacon with a flashing 60-watt lamp and amber lens. While this light was visible to the driver, it did not do a satisfactory job of illuminating the divider, nor did it light to a satisfactory degree the street-car loading zone or roadway nearby.

With the cooperation of General Electric engineers, a sodium luminaire was designed to light adequately the traffic dividers, the adjacent roadway, and the loading zones. An open-type, 10,000-lumen sodium-vapor lamp is equipped with a special reflector which sheds the yellow light down on the traffic divider, at the same time directing a high percentage of the light toward the car-loading zone and the roadway, without producing glare to bother approaching motorists.

Should the sodium lights fail, an auxiliary lighting system on the dividers is immediately turned on by a special relay. This auxiliary system consists of four marine-type units equipped with 60-watt incandescents.

The adequate lighting, combined with the caution color, is accredited with having materially aided in reducing traffic accidents. Pedestrian accidents have decreased, as have collisions with the loading-zone traffic divider cone. Motor-vehicle, pedestrian, and fixed-object (zone) accidents used to average five per year. Since the installation, in October, 1937, of the sodium safety light at the initial zone, not a single accident has occurred.

JOSEPH FEUCHTER,
Traffic Engineer, St. Louis, Mo.

Mounting 9½ Feet Higher

EXETER, CALIF., has installed a new street-lighting system of Westinghouse luminaires mounted 22 feet high on Union Metal standards in place of the former system having a mounting height of 12½ feet.

Versatile Mercury Vapor

MERCURY vapor lamps are white-lighting downtown streets in Oklahoma cities, tree lighting at the New York World's Fair, window lighting in Chicago, color matching in Mansfield, Ohio, and floodlighting in Bloomfield, N. J., says O. P. Cleaver of Westinghouse Electric & Mfg. Co.

Mounted Only 14¼ Feet High

PERHAM, MINN., has installed 48 General Electric luminaires with Gleason-Thebault rippled globes and canopies on Union Metal standards. Mounting height is 14¼ feet, and spacing is 100 feet. City officials and citizens are well pleased with the better illumination.

PAUL MILLER,
Mayor, Perham, Minn.

"MOST EXCELLENT GOOD,"

said Sir Walter Raleigh

HIGHWAY engineers all over the world agree with Sir Walter Raleigh that Trinidad Native Lake Asphalt is "most excellent good."

Trinidad Lake Asphalt contains an inherent, stabilizing mineral filler which has never been duplicated commercially. It provides an excellent balance between adhesion and cohesion. It is a thoroughly dependable asphalt—uniform in quality and characteristics.

NOW OFFERED FOR LOW-COST CONSTRUCTION AND MAINTENANCE

Barber Asphalt Corporation offers a complete line of Trinidad Lake Asphalts for *low-cost* highway construction and maintenance—including cold mixes. Mail coupon for full information about products you're interested in.

Nassau County Court House Circle, Mineola, N. Y., paved in 1938 with Trinidad Cold Plant Mix. Photograph taken March 24, 1939.

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TRINIDAD
NATIVE LAKE
ASPHALT

Why not remember to mention THE AMERICAN CITY?

Prepared by
FRANK B. WILLIAMS
Author of "The Law of City Planning and Zoning"

Zoning and Planning Notes

With the cooperation of
EDWARD M. BASSETT
Author of "Zoning" and of "The Master Plan"

Residential Zoning District—Schools

ILLINOIS.—*Catholic Bishop of Chicago v. Kingery*, 20 N. E. 2d, 583 (Supreme Court, April 14, 1939).—The plaintiff applied for a permit for the erection of a parochial school in an "A Residential" zoning district in the village of Winnetka, in which public, but not private, schools were allowed.

Held that the refusal of the permit was improper, such a school being no more detrimental to the public safety than a public school. Being conducted in accordance with the educational requirements established by state educational authorities, it would seem to be promotive of the general welfare.

Zoning Board of Appeal—Statutory Requirements

MASSACHUSETTS.—*Real Properties, Inc. v. Board of Appeal of the City of Boston*, Supreme Court, June 12, 1939, not yet reported.

In certain cases the Massachusetts statutes require that the decision should be "the unanimous decision of the entire membership of the Board." In this case the decision was made by four of the five members of the Board and one "substitute." *Held* that this decision was not in accordance with the statute, and was therefore invalid.

The requirement of a unanimous decision of the entire membership of the Board is in line with the tendency of the statutes, as well as of the decisions, to guard against the danger of breaking down the whole policy of zoning by falling into the habit of granting variances too readily. It seems unlikely that the Legislature could have meant to include in the expression "entire membership of the Board," one, or perhaps two, temporary "substitutes," chosen for the occasion, who are not referred to as members and who are to be chosen only when a "member" is disqualified or absent.

The requirement of unanimity in granting variances seems to be so explicit and evidently was regarded as so important that failure to observe it must be held to vitiate the decision. Any exercise by the Court of its discretion against granting the writ (certiorari to quash the record of the Board) for this cause would seem to be contrary to the declared legislative policy.

Residential Zoning District—Church

NEVADA.—*State ex rel. Roman Catholic Bishop of Reno v. Hill, City Engineer*, 90 Pac. 2d, 217 (Supreme Court, May 8, 1939).—The zoning ordinance of the city of Reno provides that a permit may be issued for the erection in a residential district of a building for purposes other than residential, provided that there be filed with the application for the permit written consents thereto of the owners of three-fourths of the land in the block in which the building is to be erected and of the land in the adjacent blocks facing upon the street upon which such building will face, within 500 feet of it; provided that if such written consents are so filed, then the Council may grant the application by a majority vote; otherwise only by a five-sixths vote of the members elected to the Council.

In this case, the Roman Catholic Bishop of Reno applied for a permit to erect a church in a residential district in the city. The application was not supported by the consents required by the ordinance, and the City Engineer denied the application. *Held* that the sections of the ordinance under which the application for a permit was denied bear no substantial relation to the promotion of the health, safety, morals, convenience or general welfare of Reno, and are void.

Authorities to the contrary, involving livery stables, garages, gasoline stations, funeral parlors, billboards, two-family residences, morgues, laundries, etc., afford little aid in this case. The law distinguishes between such cases and those relating to churches, schools, parks and playgrounds, art galleries, library buildings, community center buildings, etc.

The Court cites in support of its opinion the well-known case of *Village of University Heights v. Cleveland Jewish Orphans Home*, 20 Fed. 2d, 745, in which the exclusion of an orphanage from a residential district was held to be invalid; and similar cases.

EDITOR'S NOTE.—The reason why the church in this case and the Jewish Orphans Home in the University Heights case, here cited, cannot be excluded from a residential district is that, in the opinion of the respective courts, they are both residential in character; while livery stables, billboards, etc., are aliens in such districts, and may be excluded, or admitted on conditions rendering them less objectionable.

Evidently, if churches and orphans' homes are residential in character, their exclusion does not tend to promote the public health, safety, morals, convenience, or general welfare, and would not be a valid exercise of the police power.

Zoning Ordinance—Damages

NEW YORK.—*Bailer v. Ringe*, Supreme Court, Kings County, reported in *New York Law Journal*, May 10, 1939, p. 2158.—The plaintiff, an adjoining landowner, is suing in this action for an injunction to restrain the defendant from altering or using his house for an undertaking establishment, and damages on three grounds: first, that such use is in violation of a private covenant; second, that it constitutes a private nuisance; third, that it violates the city zoning ordinance. On the first two grounds the Court decides against the plaintiff, and on the third it rules in his favor, the area in question being a residential district. In so doing the Court grants the plaintiff a permanent injunction and awards him damages of $2,400, being $40 a month for the period from the beginning of the undertaking establishment, to the date of the trial; this being the lessened value of the use of his property during this period.

EDITOR'S NOTE.—The neighboring landowner is awarded damages only if he has suffered, as in this case, special damages. This case is in accord with *Sapiro v. Frisbie*, 93 Cal. A. 299,270 Pac. 280 (1928) cited by Bassett, Zoning, p. 180.

Billboards—Restriction—Need of Rule to Guide Administrative Action

SOUTH CAROLINA.—*Schloss Poster Advertising Co., Inc. v. City of Rock Hill*, 2 S. E. 2d, 392 (Supreme Court, April 14, 1939).—An ordinance of the city of Rock Hill provides that "Hereafter it shall be unlawful to erect or maintain any billboard facing on any public street or other public place" within the city without having first obtained from the City Council a permit to do so.

Held by the Court that the ordinance is void. If an ordinance which upon its face restricts the right which the individual might otherwise exercise over his property without question, not according to any general uniform rule, but so as to make the enjoyment of his right depend upon the arbitrary will of the governing authorities, it is unconstitutional and void because it fails to furnish a uniform rule of action and leaves the right of property subject to the despotic will of the authorities, who may exercise it so as to give exclusive profits or privileges to particular persons.

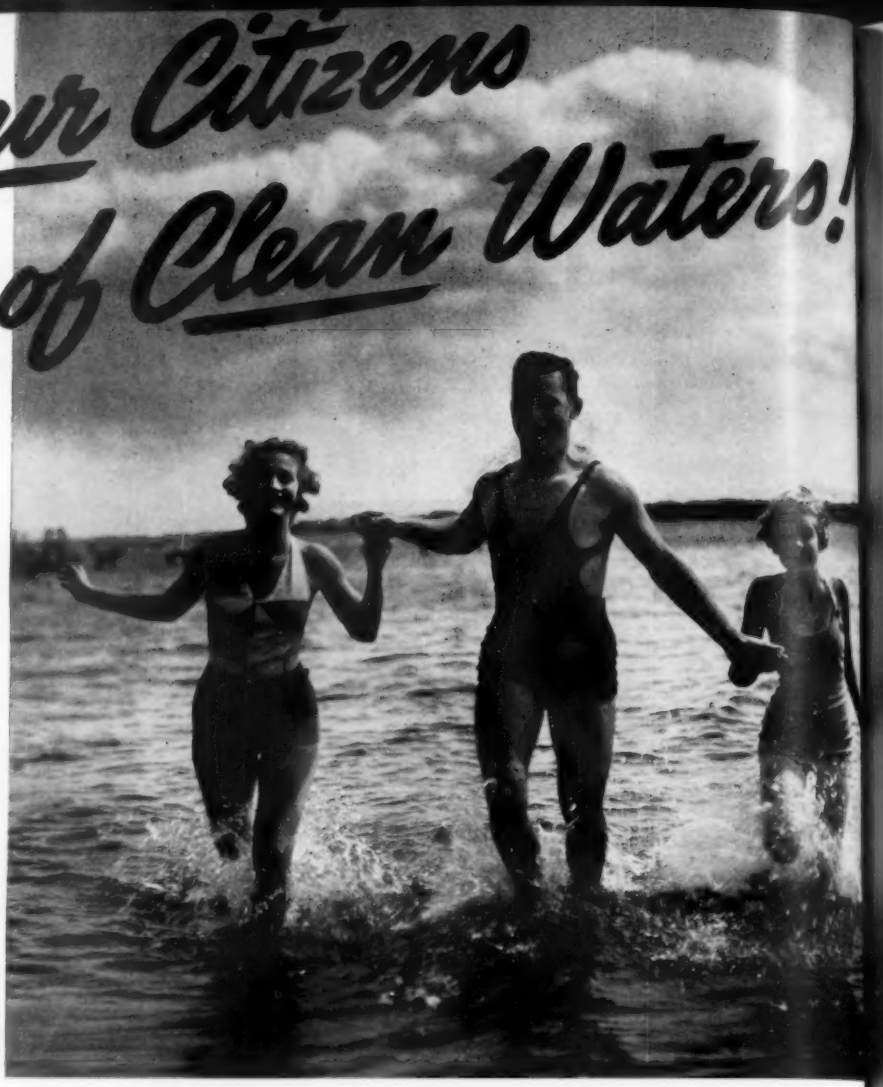
National Planning

The Progress Report of the National Resources Committee, issued as of December, 1938, is of more than usual interest; furnishing in its 51 pages a brief but comprehensive view of the subject in its many aspects.

House Trailer Regulations

The Detroit Department of Health has compiled material on House Trailer Regulations, including news articles, press comments, and court decisions involved in that city's effort to regulate the matter.

Give Your Citizens the Joy of Clean Waters!



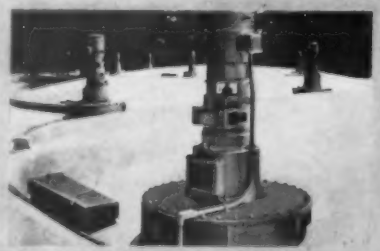
Protect Lakes and Streams Near Your City with Adequate Sewage Plants

THE lakes and streams around your city may be among its outstanding recreational resources. Be sure to keep them pure with adequate sewage-treatment facilities.

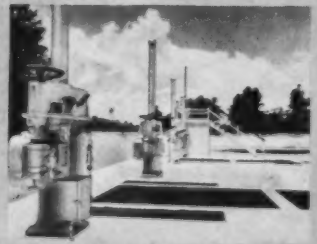
Swimming, fishing, picnicking—as well as health and property values—can all be protected if the cities in your watershed prevent pollution. The cost is only a fraction of a cent daily per person.

General Electric offers a complete line of electric equipment for modern sewage-treatment plants. The *correct* application of such equipment may affect plans for even the foundation of your plant. It's wise, therefore, to call in our engineers when plans are in the initial stage. They'll gladly work with your sanitary and consulting engineer. General Electric, Schenectady, N. Y.

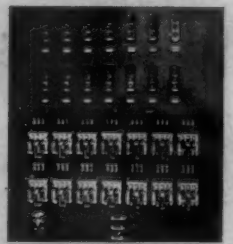
HOW G-E EQUIPMENT HELPS ATLANTA PROTECT ITS WATERS



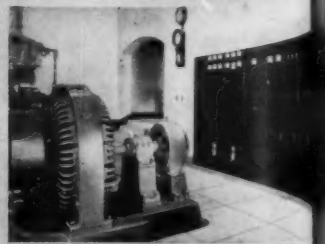
Eight of 12 G-E vertical induction motors, each coupled to a mixer used with primary digesters, in Atlanta's new R. M. Clayton plant



Five of the seventeen G-E motors operating large valves. Consulting engineers were Wiedeman and Singleton



One of several multiunit G-E controllers, cabinet door at bottom shown open



Two G-E 156-kva generators controlled by the G-E switchboard at right. The engines driving them burn sludge gas

GENERAL ELECTRIC

Court Decisions Affecting Municipalities

Conducted by A. L. H. STREET, Attorney at Law

Accidents

Statute exempting cities from liability in operating airports held constitutional and to prevent recovery for injury to person who tripped over wire strung to protect grass plot at airport (Tennessee Supreme Court: *Stocker v. City of Nashville*, 126 S. W. 2d, 339).

City held liable for collision in nighttime of automobile with an abrupt end of curbing separating electric railway space from roadway, where there was no visible warning against the curbing and the street was paved evenly to its full width as the car approached the scene of accident (California Supreme Court: *Arellano v. City of Burbank*, 89 Pac. 2d, 113).

Pedestrian's complaint in suit for injury held to state valid claim against city on ground that street was rendered dangerously slippery by excessive application of oil (New Jersey Supreme Court: *Lentini v. Town of Montclair*, 5 Atl., 2d, 692).

Under statutes, fireman's widow held to have waived right to workmen's compensation award, on account of his death in the line of duty, by accepting a monthly benefit provided for by the city's charter (Michigan Supreme Court: *MacKay v. City of Port Huron*, 284 N. W. 671).

Bond Issues

Bonds issued under limited taxing provision held properly refunded under a later statute granting unlimited taxing power (Florida Supreme Court: *State v. City of Arcadia*, 187 So. 771).

Election on question of issuing bonds to erect hospital held not vitiated by omission of express provision for equipment of hospital, that being implied. Under ordinance to issue not more than $33,000 6% hospital bonds, city held empowered to issue $39,000 4% bonds, costing less to mature than the smaller issue of 6% bonds (Arkansas Supreme Court: *Railey v. City of Magnolia*, 126 S. W. 2d, 273).

Civil Service

Police chief appointed by commission to hold during good behavior held not removable by mayor and council without cause, on commission's being abolished (Wisconsin Supreme Court: *State v. Tilleson*, 285 N. W. 501).

Patrolman held properly dismissed for misconduct in accepting money from an attorney for services in promoting the attorney's police court practice (New York Court of Appeals: Roge v. Valentine, 20 N. E. 2d, 751).

Claims Adjustment

Acceptance of warrants tendered as full payment for services rendered municipality held to bar further claim, where the amount due was disputed (Iowa Supreme Court: *Munn v. Town of Drakesville*, 285 N. W. 644).

Contracts

Innocent holders of street improvement warrants held entitled to enforce payment, despite informal procedure in awarding paving contract, where there was substantial compliance with a requirement for competitive bidding, the work was done at a reasonable price and was accepted (United States Circuit Court of Appeals, Fifth Circuit: *City of Kingsville, Tex., v. Meredith*, 103 Fed. 2d, 279).

Employment of architects to prepare plans for municipal building project was void for non-compliance with charter requirements. After project was abandoned, city confessed judgment under compromise of architects' claim for services rendered. Held: Taxpayers had right to enjoin payment of judgment, regardless of any conceptions as to moral obligation of city to pay (Massachusetts Supreme Court: *Connor v. Morse*, 20 N. E. 2d, 424).

Elections

Bond election held not vitiated because voting places were not same as those regularly used, where voters readily found places (Arkansas Supreme Court: *Railey v. City of Magnolia*, 126 S. W. 2d, 273).

Fire Protection

Village held not liable for private fire losses attributed to village negligently permitting nearby building to be constructed without proper safeguards against fire (New York Supreme Court, New York County: *Falk v. Incorporated Village of Great Neck Plaza*, 11 N. Y. Supp. 383).

Home-Rule Cities

Statute, applicable to cities incorporated under general laws, permitting recovery from gas company for failing to file reports, held not available to home-rule cities (Texas Commission of Appeals: *City of Sherman v. Municipal Gas Co.*, 127 S. W. 2d, 193).

Judgments

City attorney held presumed to have been authorized to agree to entry of judgment against city until contrary is affirmatively proved (Massachusetts Supreme Judicial Court: *City of Medford v. Corbett*, 20 N. E. 2d, 402).

Licenses

$500 license tax imposed against distributors of beverages from warehouses located outside city held unreasonable and void (Alabama Supreme Court: *Rochell v. City of Florence*, 188 So. 247).

Ordinance regulating and licensing rendering plants upheld (Wisconsin Supreme Court: *La Crosse Rendering Works v. City of La Crosse*, 285 N. W. 393).

Municipal Utilities

Under statute, city held entitled to court order fixing reasonable conditions on which it could maintain electric power lines through adjacent municipalities, where no agreement on conditions could be reached (California District Court of Appeal: *City of Los Angeles v. City of Huntington Park*, 89 Pac. 2d, 702).

Under statute, town held empowered to furnish electric service to consumers outside as well as within municipal limits (North Carolina Supreme Court: *Kennerly v. Town of Dallas*, 2 E. 2d, 538).

Official Ouster

Mayor held properly ousted from office on conviction of protecting gambling in city, despite pendency of appeal from the conviction (Washington Supreme Court: *State v. Frater*, 89 Pac. 2d, 1046).

Police Commissioner held not subject to ouster for receiving, for benefit of a special police fund, payments made by company that maintained soft-drink vending machine in police station, although the payments should have been made to the city (Oklahoma Supreme Court: *Shields v. State*, 89 Pac. 2d, 756).

Official Publications

Under statutory requirement for publishing tax sale notice once a week for six successive weeks, notice held not effective until six weeks after first publication (New York Court of Appeals: *Olds v. City of Jamestown*, 20 N. E. 2d, 756).

Ordinances

Ordinance title showing that ordinance related to alcoholic liquors held sufficient to cover prohibition against driving automobile while intoxicated (Nebraska Supreme Court: *Gembler v. City of Seward*, 285 N. W. 542).

Pensions

Disabled city employee held not barred from claiming back pension because of three years' delay in suing to compel payment (Florida Supreme Court: *State v. Ulsch*, 188 So. 216).

Referendum Measures

Thirty days held sufficient time for filing petition for referendum on ordinance. Ordinance declaring emergency held not to prevent referendum but to become effective from its passage on no referendum being taken (Arkansas Supreme Court: *Railey v. City of Magnolia*, 126 S. W. 2d, 273).

Salaries

Under San Francisco charter, ordinance attempting to increase salaries of employees after adoption of annual salary ordinance held void, although there were funds available to pay the increased salaries (California District Court of Appeal: *Sullivan v. McKinley*, 89 Pac. 2d, 125).

Sewage Disposal

Riparian owner held entitled to recover from city, as damages for pollution of sand and gravel by discharge of sewage into river, the difference in the value of the land before and after pollution (New York Supreme Court, Appellate Division: *Squaw Island Freight Terminal Co. v. City of Buffalo*, 11 N. Y. Supp. 2d, 459).

Riparian landowner's right to damages for city's discharge of sewage into creek held barred by five-year statute of limitations (Missouri Supreme Court: *Riggs v. City of Springfield*, 126 S. W. 2d, 1144).

Sidewalks

Abutter held not bound to maintain guardrail around areaway in sidewalk, where guardrail had been constructed by city in making street improvement (South Dakota Supreme Court: *Fenton v. Ackerman*, 285 N. W. 516).

Slot Machines

Miniature mechanical baseball game operated by slot machine, involving exercise of skill, held not a gambling device where there was no "pay-off" excepting a chance to win a $2 prize for the highest score of the day (Tennessee Supreme Court: *Town of Centerville v. Burns*, 126 S. W. 2d, 322).

Special Assessments

Payment of interest on special assessment certificates out of collections of principal paid on assessments held proper. City negligently permitting assessments to outlaw held not liable to certificate holders in damages exceeding value of assessments prorated to outstanding certificates (United States Circuit Court of Appeals, Fifth Circuit: *City of El Paso v. West*, 102 Fed. 2d, 927).

Taxation

Municipal tax of 10 per cent on gross receipts of commercial parking lots held invalid as unauthorized by statute and as being unreasonable, discriminatory and confiscatory (Pennsylvania Superior Court: *Sley System Garages v. City of Philadelphia*, 5 Atl. 2d, 583).

City held not entitled to abatement of use tax imposed by state on articles bought for use in operating its water system (Washington Supreme Court: *City of Spokane v. State*, 89 Pac. 2d, 826).

Traffic Regulations

Village parking meter ordinance, adopted under statutory authority, upheld (New York Supreme Court, Nassau County: *Gilsey Buildings, Inc., v. Incorporated Village of Great Neck Plaza*, 11 N. Y. Supp. 2d, 694).

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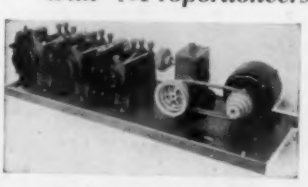

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Public Health

Public Health Law.—By James A. Tobey, Dr. P. H., LL.D., Member of the New York Bar, Lecturer on Public Health Law at Harvard University, School of Public Health, and at Massachusetts Institute of Technology. Second Edition. The Commonwealth Fund, New York. 1939. xx + 414 *pp.* $3.50.

In the long history of public health in this country there have been only three books dealing with its legal aspects. The first, the work of two eminent attorneys, was published nearly fifty years ago, the second, by a physician, was issued more than thirty years ago, and the third, by Dr. Tobey, was the first edition of the present book and published a decade ago. The present edition is comprehensive and more efficiently arranged than the earlier volume, which has been completely re-written. The book is divided into four parts: Part I, dealing with the public health law and administration, covering the sources of public health law and the police power of health departments, as well as state and local health departments, health officers and employees; Part II, covering the powers and duties of health departments, such as vital statistics, the control of communicable diseases and tuberculosis, venereal disease, milk control, the oversight of foods, drugs and cosmetics, nuisances and sanitation, vaccination, school hygiene, and industrial hygiene; Part III, covering the liability of municipal corporations, the personal liability of health officers and the liability of individuals and corporations in matters affecting the public health; Part IV, covering legislation and law enforcement, dealing particularly with the preparation and adoption of health legislation and the methods of enforcing the law and procedure at court. The three well-prepared appendices cover legal decisions, the use of references, and a selected bibliography.

Housing Legislation

Legal Problems in the Housing Field—Part 1. Private Housing Legal Problems, by Horace Russell, and Part 2. Legal Aspects of Public Housing, by Leon H. Keyserling. Prepared for the Industrial Committee of the National Resources Committee. U. S. Government Printing Office, Washington, D. C. 1939. 77 *pp.* 25c.

The first part of this monograph, which discusses some of the legal difficulties that private builders have to face, analyzes state laws on mortgages, foreclosures, mechanics' liens and methods of title proof. The second part analyzes the United States Housing Act of 1937 and the complementary state legislation, and discusses legal problems raised by them. Suggestions are made for the improvement of legislation to eliminate some of the present difficulties. In some cases, new legislation is recommended. Summary data and statistics on legislation are given in extensive charts at the back of the bulletin.

Planning

A Mapping Program for New York State, and separately bound Appendix. Report of the Advisory Committee on Maps and Surveys, to the State Planning Council. Division of State Planning, Albany, N. Y. 1938. 72 + 90 *pp.*

Recommendations for a comprehensive program of mapping for New York State, which would supply present lacks and future needs, is outlined in this report, on the basis of a detailed, but non-technical, analysis of the five main types of mapping—topographic, air, soil, geologic and vegetational. The status of each type of mapping, as well as the general historical background of maps and mapping, are discussed. Samples are included. The Appendix gives supporting data for each aspect of the program, as well as an inventory of the types of maps discussed.

Business and Industrial Development

Our Town's Business.—By Omar and Ryllis Goslin, authors of "Rich Man, Poor Man." Funk & Wagnalls Co., New York. 1939. *xiv* + 355 *pp.* $3.50 *from* THE AMERICAN CITY.

This book presents, in a simple, readable style, the character, trends and principal problems of business in the present-day cities, towns and villages of this country, in terms of what these problems mean to the average citizen, and with the profuse use of the same type of dramatic, telling picture-charts which made "Rich Man, Poor Man" so live and compelling. The book discusses such vital questions as the growth of monopolies, absentee ownership, "Can we afford to buy American?", increasing unemployment, labor problems, control of business by government. General discussion of problems is illustrated by examples in particular communities.

Housing

Housing Yearbook—1939.—Coleman Woodbury, Editor. National Association of Housing Officials, 1313 E. 60th St., Chicago, Ill. 1939. *vii* + 240 *pp.* $3.00.

This annual summary of housing activity presents again the means of catching up and gaining a perspective on events, progress and developments in the field. Special articles have been omitted this year, the volume being devoted largely to reference material. The largest and first section is that which describes 1938 state and local housing—first because of the increasing importance of the locality in planning and administering public housing programs. Activities of the Federal agencies, of national unofficial organizations and of NAHO are outlined as usual, and the useful lists of official and unofficial agencies are included. A chapter, "A NAHO'er Reviews the Year," summarizes, from the bird's-eye view of the NAHO office, general trends and directions in housing, outstanding events, danger-spots and problems which have emerged during the year.

Trailers

Special Report of Trailers and Trailer Camps.—Prepared by Karl M. Tomfohrde, Planning Assistant, with the aid of the WPA. State Planning Board, Room 24, State House, Boston, Mass. Limited edition. June, 1939. 64 *pp.*

With the tremendous increase in number of trailers in this country, the Massachusetts Planning Board has made a study of the problems to states and localities attendant upon trailers, relating to health, sanitation, zoning, education, taxation, public welfare, labor, traffic control, and fire and police protection. The report gives recommendations for their regulation and for provisions that should be made for them, including suggested detailed layouts and plans for trailer camps. It is hoped that Massachusetts may thereby prepare in advance for a possible large influx of trailers into the state.

Planning

From the Ground Up.—By the New England Regional Planning Commission of the National Resources Committee, 2100 Federal Bldg., Boston, Mass. 1939. 54 *pp.*

A most forceful and dramatic statement of the reasons for planning not only for New England but for anywhere is contained in this attractive pamphlet, illustrated on every page with before-and-after or good-and-bad photographs. It explains briefly and to the point the advantages of planning in relation to business centers and traffic, zoning, public utilities, airports and airways, housing, conservation and soil erosion, recreation, flood control, forestry, wildlife, etc.

Public Works

Public Works Engineers' Yearbook 1939. *American Public Works Association, Chicago, Ill.* 1939. 457 *pp.* $3.50.

Like last year's volume, this review and evaluation of activities and developments in the entire public works field in 1938 is divided into two major parts. The first outlines major 1938 events in the administration of public works—personnel, planning, programming and organization; and in public works engineering —streets and roads, sewage treatment, water supply and purification, waste collection and disposal, traffic, flood control, drainage, field engineering. The second part reports discussions at the Public Works Congress held in New York City last year.

Government and Administration

History of the London County Council, 1899-1939.—By Sir Gwilym Gibbon, C.B. C.B.E., D.Sc., and Reginald W. Bell, LL.M., Barrister-at Law. The Macmillan Co., New York. 1939. *xxi* + 696 *pp.* $7.00 *from* THE AMERICAN CITY.

Despite its somewhat ponderous appearance, this "biography" of the London County Council, issued to commemorate its jubilee, is written in fresh, brisk, readable style. It not only outlines the factual history of the Council, but shows the changing character and function of government in London during the past fifty years, and in general the changing nature of public and private life in London which this growth and development of government reflects.

The history goes back to analyze the antecedents of government in London which led to the creation of the Council. It describes how the Council works—its party system, the organization of its committees and departments, its "domestic" services, such as finance, staff and supplies; its executive services, such as building control and city planning; its external relations with other levels of government and the London citizen. Two of the apt and entertaining cartoons with which the book is illustrated are reproduced on pages 5 and 39 of this issue.

Crime

What Makes Crime?—By Winthrop D. Lane. Public Affairs Committee, Inc., 30 Rockefeller Plaza, New York, N. Y. 1939. 31 *pp.* 10c.

A quick picture of the crime situation in this country, this pamphlet tells the story of a boy who grew up to be a criminal, and discusses the causes of crime, its trends, costs, prevention. Like other Public Affairs Pamphlets, this one is written with interest, and effectively illustrated with picture charts.

Recreation

Recreation, July, 1939, *issue. National Recreation Assn., 315 Fourth Ave., New York.* 55 *pp.* 25c.

This issue of *Recreation*, devoted largely to swimming pools and water sports, contains a number of articles of interest to AMERICAN CITY readers. Among these are "A Swimming Pool as a Recreation Center," which describes community use of a high-school swimming pool in Sacramento; "Swimming Pool Construction and Operation," which discusses features of the Beverly Hills swimming pool; "Recreational Aspects of Stream Pollution," which considers the bill now before Congress for the control of water pollution through the creation of a Division of Water Pollution Control; "A City-Wide Swimming Program," describing the extensive water program in Washington, D. C.; "The Playground Newspaper"; "Playground Beautification"; and several others describing city park and playground activities and special community sports days and celebrations.

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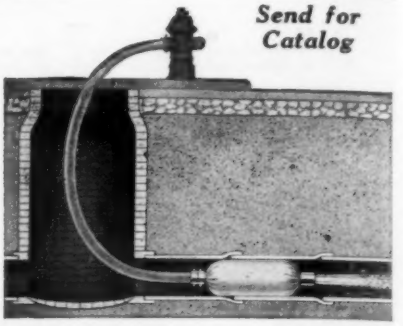

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Public Welfare

When Social Work Was Young.—By Edward T. Devine. The Macmillan Co., New York. 1939. 163 *pp.* $1.75 *from* THE AMERICAN CITY.

This is the story of the development of "organized social work" from "organized charity," and the part played by leaders in the field, during the last 40 years, and particularly during the nineties and the first decade of this century, told through personal recollections, by a man who has been a leader in social welfare movements in this country. The book describes the beginnings of the widespread movement for housing reform during this period, the fight against tuberculosis, the history of the *Survey Graphic* and *Survey Midmonthly*, the history of relief, social legislation and training for social work during this time.

Government and Administration

The Book of the States, 1939-40, Volume III. The Council of State Governments, Chicago, Ill. 1939. *xix* + 454 *pp.* $3.50 *from* THE AMERICAN CITY.

The first part of this useful volume describes the aims, organization and activities of the Council of State Governments and the various conferences held under its auspices; the second part, devoted to reference material, summarizes activities and trends of all branches of state government during the last two years, gives condensed proceedings of conferences relating to state government, lists state officials, legislators and standing committees of legislatures, and includes a bibliography. One section of the second part gives an interesting over-all statistical and descriptive summary of each state. For the first time this year material on Federal-state relationship is included.

Water Planning

A State Plan for Missouri—Water Plan, 1938. WPA cooperating with the Water Resources Committee of the Missouri State Planning Board, Jefferson City, Mo. 1939. *xiv* + 111 *pp.* 25c.

This report indicates the principal water problems of the various drainage basins in Missouri, and outlines a tentative plan for water development and control for the whole state, including suggested projects. It considers the many varied aspects of a unified water development program: water supply, waste disposal, malaria control, flood correction, drainage, power, erosion, irrigation, recreation, wildlife.

Review of Assessments

Judicial Review Agencies.—Fifth Progress Report of the Committee on Assessment Organization and Personnel, National Association of Assessing Officers, 1313 E. 60th St., Chicago, Ill. 1939. 25 *pp.* 75c.

In this bulletin are described the practices of review of illegal and irregular assessments by the courts in the different states, and review of assessments by the Federal courts. The question is presented: "Why have judicial review?" And recommendations are made for procedure that would lessen if not eliminate review of assessment made to the courts, thus improving standards in the administrative process.

Government and Administration

The Administration of Paris and Montreal —A Comparative Study.—By Alfred John Pick, M. A. Published by McGill University, Montreal, Canada. 1939. 207 *pp.* $1.00 *postpaid.*

This is a scholarly study of the governments of Paris and Montreal, and a comparison of the two administrations, particularly from the financial point of view. It includes, also, a general description of municipal government in France and Canada, as well as considerable discussion of the local government in other countries, as compared to that in these two countries. The particular problems facing Montreal are analyzed, and solutions to them considered.

Local Broadcasts to Schools

Local Broadcasts to Schools.—Edited by Irvin Stewart, Director, Committee on Scientific Aids to Learning. The University of Chicago Press, Chicago, Ill. 1939. *vii* + 239 *pp.* $2.00 *from* THE AMERICAN CITY.

This book presents the experience of six cities, of varying populations, in the preparation and presentation of radio programs for local schools, either by the pupils themselves or others, to extend and supplement the regular program of the school, or to interpret the schools to the public. The story of this activity in each city covers, among others, the following points: type of program and its preparation, the part of the teachers and pupils in receiving the broadcast, fitting the broadcast to the school schedule, relationship with broadcasting stations, radio receivers, costs of radio programs, value and results of programs, difficulties encountered.

Safety

Accident Facts—1939 Edition.—By The National Safety Council, Inc., 20 N. Wacker Drive, Chicago, Ill. 104 *pp.* 50c, *special rates if bought in quantity.*

This pamphlet presents again 1939 accident trends, and comparison of this year with other years, in brief descriptive form illustrated with charts and graphs, and in summary table form. Facts are given for each type of accident—occupational, motor vehicle, other public, railroad, aviation, school, home—and each is analyzed in its relation to age group, location, time of year or other significant factor or cause. Statistics this year show a reduction of 11,000 accidents over last year.

Housing

Annual Report of the Citizens' Housing Council of New York, May 1, 1938 - April 30, 1939. Citizens' Housing Council of New York, 470 Fourth Ave., New York. 1939. 26 *pp.* 10c.

This is the report of the second year of existence of the Citizens' Housing Council, an up-and-coming organization which has been able to get together for agreement persons of widely different points of view in the field of housing. The report summarizes briefly and with interest the Council's activities in the field of publications, cooperation with official agencies, public education, sustained services and special activities and studies.

Building Codes

Building Code for California.—Edwin Bergstron, Editor. Sponsored by the California State Chamber of Commerce, San Francisco, Calif. 1939. *xxxiv* + 473 *pp.* $5.00.

After the earthquakes of Santa Barbara and Long Beach showed that existing building codes provided for inadequate resistance of buildings to earth movements, this code was prepared, over a period of ten years, by a group of California architects, engineers, constructors and building officials. Its three general divisions cover scope and administration, architectural planning, and structural design; and provide, within reasonable cost, for reasonable safety of buildings against fire, earth movements, overcrowding and overloading, rodents and termites.

Housing and Taxation

Local Taxation and Housing. June, 1939, *issue of Tax Policy. Tax Policy League, 907 Broadway, New York.* 72 *pp.* 50c.

This Majority Report of the Taxation Committee of the Citizens' Housing Council is an attempt "to bridge the gap between housing specialists and tax economists." It deals not only with the problem of subsidy, but with the effect which the existing system of taxation in New York City exercises on private housing development. Main section titles are: Forms of Subsidy; Methods of Financing Subsidy; Fiscal Policies as a Method of Promoting or Retarding Property Improvement for Residential Purposes; Summary.

Housing

Watling: A Survey of Social Life on a New Housing Estate.—By Ruth Durant. P. S. King & Son, Ltd., Orchard House, Westminster, S. W. 1, London, England. 1939. *xiv* + 128 *pp.* 7s. 6d.

Watling is typical of the public housing projects of the cottage estate type on the outskirts of big English cities. In an attempt to analyze the social needs of such estates, this study has been made to answer for Watling the following questions: "Has the New Housing Estate grown into a community? What role has the Community Centre played in local social life?" The book describes the settlement of the estate, the social patterns that have evolved there the organization and activities of its institutions, particularly the community center. It is interesting not only as a housing study, but as an analysis of present-day, urban, social forces in a new community.

School and Government

Relationship of Local School Systems to Council-Manager Plan of Municipal Government. Educational Research Service, 1201 16th St., N. W., Washington, D. C. April, 1939. 20 *pp.* 50c.

This circular gives the replies received from 44 of the 45 city-manager cities of over 50,000 population, in answer to a questionnaire on the relationship between the school system and the government in these cities. The questionnaire was sent out as a result of questions raised by the recent proposal for a new government for the city of Washington, D. C., which would make the school system one of 17 administrative departments under a governing authority consisting of a council and "District Administrator" similar to a city manager. The results show that school systems are no more dependent on the city government in council-manager cities than in other cities.

Housing

New York State to Finance Low-Rent Housing.—In the June 23d issue of NAHO News, National Association of Housing Officials, 1313 E. 60th St., Chicago, Ill. 3 *pp.* 20c.

This article, printed substantially as written by George A. Boehm, Chairman of the Laws and Administration Committee of the Citizens' Housing Council of New York, describes and evaluates the Desmond-Moffett Bill, recently passed by the New York State Legislature, which provides for low-rent housing under the state constitution amendments adopted last year. The article describes the following aspects of this pioneer bill: administration; loans and subsidies available; acquisition of property; municipal indebtedness and taxes authorized; conditions of loans and subsidies; fixing of rental and tenant selection; limited-dividend program.

Other Reports Received

BRONXVILLE, N. Y.—Report of the Board of Trustees, 1938-39. 28 pp.

DETROIT, MICH.—Annual Report, Housing Commission, 1938. 86 pp.

BRIDGEPORT, CONN. — Fifteenth Anniversary Number, Fairfield County Planning Assn. 1939. 15 pp.

LITTLE ROCK, ARK.—Annual Report, Municipal Water Works, 1937-38. 65 pp.

LOS ANGELES, CALIF.—"Today's Leisure." Department of Playground and Recreation. 1938. 57 pp.

NEW ROCHELLE, N. Y.—Auditor's Annual Report, 1938. 178 pp.

PORT WASHINGTON, WIS.—Comprehensive City Plan. By Arthur J. Rabuck, City Planning and Zoning Consultant, Milwaukee, Wis. City Planning Commission. 1939. 37 pp. $1.00.

PROVO, UTAH.—Annual Report, 1938. 87 pp.

ROYAL OAK, MICH.—"Royal Oak, A City of Homes." 1939. 29 pp.

SALINA, KANS.—Annual Report, City Clerk. 1938. 44 pp.

WESTMOUNT, CANADA.—Annual Report, 1938. 58 pp.

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There can be but one reason for Chevrolet's predominant leadership in sales. It is that buyers, in business and in industry, purchase motor trucks as they purchase other capital equipment, on the basis of the maximum return on their investment—and have concluded that the best buy is Chevrolet.

*Latest available R. L. Polk & Company official registration figures through May, 1939.

1st in Value
1st in Economy
1st in Sales

Lower Prices
Lower Operating Costs
Lower Upkeep

CHEVROLET MOTOR DIVISION, *General Motors Sales Corporation*, DETROIT, MICHIGAN
General Motors Instalment Plan—convenient, economical monthly payments. A General Motors Value.

DESIGNED FOR THE LOAD — CHEVROLET — POWERED FOR THE PULL

MASSIVE NEW SUPREMLINE TRUCK STYLING . . . COUPE-TYPE CABS . . . VASTLY IMPROVED VISIBILITY • FAMOUS VALVE-IN-HEAD TRUCK ENGINE • POWERFUL HYDRAULIC TRUCK BRAKES (Vacuum-Power Brake Equipment optional on Heavy Duty models at additional cost) • FULL-FLOATING REAR AXLE on Heavy Duty models only (2-Speed Axle optional on Heavy Duty models at additional cost)

Conventions - - When and Where

Meeting is annual convention unless otherwise designated

AUGUST 14-17.—CEDAR RAPIDS, IOWA.
League of Iowa Municipalities. Sec.-Treas., Frank G. Pierce, Marshalltown, Iowa.

AUGUST 17-19.—WRIGHTSVILLE BEACH, N. C.
North Carolina League of Municipalities. (Ocean Terrace Hotel.) Exec. Sec., Patrick Healy, Jr., 704 Raleigh Bldg., Raleigh, N. C.

AUGUST 21-25.—SAN FRANCISCO, CALIF.
Illuminating Engineering Society. (Hotel Fairmont.) Gen. Sec., A. D. Cameron, 51 Madison Ave., New York.

AUGUST 22-24.—NEW YORK CITY.
National Shade Tree Conference. (Hotel Astor.) Sec.-Treas., L. C. Chadwick, Ohio State Univ., Columbus, Ohio.

AUGUST 24-25.—DULUTH, MINN.
American Water Works Association—Minnesota Section. (Duluth Hotel.) Sec.-Treas., Ronald M. Finch, Wallace & Tiernan Co., Inc., 414 Flour Exchange, Minneapolis, Minn.

AUGUST 31-SEPTEMBER 1.—BETHLEHEM, PA.
League of Cities of the Third Class in Pennsylvania. (Hotel Bethlehem.) Sec., Herman A. Early, City Hall, Harrisburg, Pa.

AUGUST 31-SEPTEMBER 1.—ST. GEORGE, UTAH.
State Municipal League of Utah. (Liberty Hotel.) Sec., T. McCoy, Public Safety Bldg., Salt Lake City, Utah.

SEPTEMBER, 2D WEEK.—NEW BRAUNFELS, TEXAS.
League of Texas Municipalities. (Faust Hotel.) Exec. Sec., E. E. McAdams, 2223 Guadalupe St., Austin, Texas.

SEPTEMBER 6-9.—PRINCETON, N. J.
Governmental Research Association. (Princeton Inn.) Sec.-Treas., Robert M. Paige, 1313 E. 60th Street, Chicago, Ill.

SEPTEMBER 7-8.—CHARLOTTESVILLE, VA.
American Water Works Association—Virginia Section. (Univ. of Virginia.) Sec., H. W. Snidow, 119 State Office Bldg., Richmond, Va.

SEPTEMBER 11-14.—SUN VALLEY, IDAHO.
Montana National Bituminous Conference. Address: D. A. McKinnon, Gen. Chmn., Montana State Highway Dept., Helena, Mont.

SEPTEMBER 12-14.—KANKAKEE, ILL.
Illinois Municipal League. Sec., A. D. McLarty, 500 E. Capitol Ave., Springfield, Ill.

SEPTEMBER 12-15.—MONTREAL, QUE.
New England Water Works Association. (Hotel Windsor.) Sec., Frank J. Gifford, 613 Statler Bldg., Boston, Mass.

SEPTEMBER 14-16.—BISMARCK, N. DAK.
League of North Dakota Municipalities. (Patterson Hotel.) Address: Exec. Sec., Myron H. Atkinson, City Auditor, Bismarck, N. Dak.

SEPTEMBER 14-15.—RAPID CITY, S. DAK.
South Dakota Water and Sewage Works Conference. (Hotel Alex Johnson.) Sec., W. W. Towne, State Board of Health, Pierre, South Dakota.

SEPTEMBER 14-15.—WAUSAU, WIS.
League of Wisconsin Municipalities. Sec., Frederick MacMillin, 30 E. Johnson St., Madison, Wis.

SEPTEMBER 18-21.—PHILADELPHIA, PA.
American Institute of Park Executives. (Bellevue-Stratford Hotel.) Exec. Sec., Will O. Doolittle, Box 422, Tulsa, Okla.

SEPTEMBER 18-19.—DENVER, COLO.
American Water Works Association—Rocky Mountain Section. (Shirley-Savoy Hotel.) Sec., B. V. Howe, State Office Bldg., Denver, Colorado.

SEPTEMBER 18-20.—JOHNSTOWN, PA.
American Water Works Association—Western Pennsylvania Section. (Fort Stanwix Hotel.) Sec., E. P. Johnson, 418 Flannery Bldg., Pittsburgh, Pa.

SEPTEMBER 18-21.—OAKLAND, CALIF.
League of California Municipalities. Sec., Richard Graves, 223 City Hall, San Francisco.

SEPTEMBER 18-19.—OAKLAND, CALIF.
California Sewage Works Association. Sec., Fred D. Bowlus, 202 Law Bldg., Los Angeles, Calif.

SEPTEMBER 18-19.—OLD POINT COMFORT, VA.
League of Virginia Municipalities. Exec. Sec., Morton L. Wallerstein, 902 Travelers Bldg., Richmond, Va.

SEPTEMBER 20-22.—LANSING, MICH.
American Water Works Association—Michigan Section. (Olds Hotel.) Sec., M. N. Gerardy, Water Board Bldg., Detroit, Mich.

SEPTEMBER 20-23.—SAN FRANCISCO, CALIF.
International Association of Fire Chiefs. (Fairmont Hotel.) Sec., James J. Mulcahey, 16 Franklin Ave., Yonkers, N. Y.

SEPTEMBER 20-21.—DANVILLE, KY.
The Kentucky Municipal League. (Hotel Gilcher.) Exec. Sec., Carl B. Wachs, Administration Bldg., Univ. of Kentucky, Lexington, Kentucky.

SEPTEMBER 22-23.—DICKINSON, N. DAK.
North Dakota Water and Sewage Works Conference. Acting Sec.-Treas., L. K. Clark, Bureau of Sanitary Engineering, Bismarck, North Dakota.

SEPTEMBER 25-27.—WICHITA, KANS.
League of Kansas Municipalities. (Hotel Lassen.) Exec. Sec., John G. Stutz, Lawrence, Kansas.

SEPTEMBER 28-30.—MORGANTOWN, W. VA.
American Water Works Association—West Virginia Section. (Morgan Hotel.) Sec., John B. Harrington, State Dept. of Health, Charleston, W. Va.

SEPTEMBER 29-30.—WINCHENDON, MASS.
New England Sewage Works Association. (Toy Town Tavern.) Sec.-Treas., L. W. Van Kleeck, State Dept. of Health, Hartford, Conn.

OCTOBER 2-7.—BUENOS AIRES, S. A.
Pan-American Congress for Housing. Address: Sec., Ministry of Foreign Affairs, 953 Calle Santa Fe, Buenos Aires, S. A.

OCTOBER 5-6.—READING PA.
American Water Works Association—Four States Section. (Berkshire Hotel.) Sec.-Treas., Carl A. Hechmer, Washington Suburban Sanitary Dist., Hyattsville, Md.

OCTOBER 5-6.—TOLEDO, OHIO.
Ohio Conference of Sewage Treatment. (Commodore Perry Hotel.) Sec., B. M. McDill, Dept. of Health, Columbus, Ohio.

OCTOBER 9-10.—SANTA FE, N. MEX.
American Planning and Civic Association. National Parks Conference. Exec. Sec., Harlean James, 901 Union Trust Bldg., Washington, D. C.

OCTOBER 9-11.—PITTSBURGH, PA.
American Public Works Association. Exec. Dir., Frank W. Herring, 1313 E. 60th St., Chicago, Ill.

OCTOBER 9-12.—SAN FRANCISCO, CALIF.
International Association of Chiefs of Police. (Fairmont Hotel.) Exec. Vice-Pres., William P. Rutledge, 1313 E. 60th St., Chicago, Ill.

OCTOBER 9-12.—DETROIT, MICH.
International City Managers' Association. (Hotel Statler.) Exec. Dir., Clarence E. Ridley, 1313 E. 60th St., Chicago, Ill.

OCTOBER 9-12.—PROVIDENCE, R. I.
International Municipal Signal Association, Inc. (Providence-Biltmore Hotel.) Sec., Irvin Shulsinger, 7 E. 42d St., New York.

OCTOBER 9-13.—BOSTON, MASS.
National Recreation Association. (Hotel Statler.) Sec., Howard S. Braucher, 315 Fourth Ave., New York.

OCTOBER 10-13.—SAN FRANCISCO, CALIF.
National Association of Assessing Officers. Exec. Dir., Albert W. Noonan, 1313 E. 60th St., Chicago, Ill.

OCTOBER 11-13.—KANSAS CITY, MO.
American Water Works Association—Missouri Valley Section. (Hotel President.) Sec., Earl L. Waterman, Univ. of Iowa, Iowa City, Iowa.

OCTOBER 12-13.—CHICAGO, ILL.
Central States Sewage Works Association. (Congress Hotel.) Sec., W. H. Wisely, State Dept. of Public Health, Springfield, Ill.

OCTOBER 12-14.—FREMONT, NEBR.
League of Nebraska Municipalities. (Pathfinder Hotel.) Sec.-Treas., C. E. Beals, 204 Brownell Bldg., Lincoln, Nebr.

OCTOBER 14-17.—ATLANTIC CITY, N. J.
Institute of Traffic Engineers. (Ritz-Carlton Hotel.) Sec.-Treas., Harold F. Hammond, 60 John St., New York.

OCTOBER 16-19.—DALLAS, TEXAS.
American Water Works Association—Southwest Section. Sec.-Treas., Lewis A. Quigley, 3320 W. Berry St., Fort Worth, Texas.

OCTOBER 16.—PITTSBURGH, PA.
Conference of Municipal Public Health Engineers. Sec.-Treas., Alfred H. Fletcher, City Health Dept., Memphis, Tenn.

OCTOBER 16-19.—SAN FRANCISCO, CALIF.
Municipal Finance Officers' Association of the United States and Canada. (Empire Hotel.) Exec. Dir., Carl H. Chatters, 1313 E. 60th St., Chicago, Ill.

OCTOBER 16-20.—CINCINNATI, OHIO.
National Association of Public School Business Officials. Sec., H. W. Cramblet, Board of Education, Pittsburgh, Pa.

OCTOBER 16-20.—ATLANTIC CITY, N. J.
National Safety Council. Mng Dir., W. H. Cameron, 20 N. Wacker Drive, Chicago, Ill.

OCTOBER 16-19.—SAN FRANCISCO, CALIF.
National Tax Association. (The Palace Hotel.) Sec., W. G. Query, South Carolina Tax Commission, Columbia, S. C.

OCTOBER 17-20.—PITTSBURGH, PA.
American Public Health Association. (William Penn Hotel.) Exec. Sec., Dr. Reginald M. Atwater, 50 W. 50th St., New York.

OCTOBER 20-21.—ATLANTIC CITY, N. J.
American Water Works Association—New Jersey Section. (Claridge Hotel.) Sec.-Treas., H. N. Lendall, College of Engineering, Rutgers Univ., New Brunswick, N. J.

OCTOBER 22-25.—CHICAGO, ILL.
National Association of Commercial Organization Secretaries. (Edgewater Beach Hotel.) Asst. Sec.-Treas., Norma McKellops, 1615 H St., N. W., Washington, D. C.

OCTOBER 23-24.—PRATT, KANS.
Kansas Association of Municipal Utilities. (Roberts Hotel.) L. C. Angevine, McPherson, Kansas.

OCTOBER 25-28.—SAN FRANCISCO, CALIF.
American Water Works Association—California Section. (Fairmont Hotel.) Sec.-Treas., Burton S. Grant, Box 240, Arcade Annex, Los Angeles, Calif.

OCTOBER 25-26.—MILWAUKEE, WIS.
Wisconsin Chiefs of Police Association. (Hotel Pfister.) Sec., R. H. McCarty, Kaukauna, Wis.

OCTOBER 30-NOVEMBER 1.—OSHKOSH, WIS.
American Water Works Association—Wisconsin Section. (Raulf Hotel.) Sec., L. A. Smith, City Hall, Madison, Wis.

NOVEMBER.—INDIANAPOLIS, IND. (Date later.)
National Municipal League. Sec., Howard P. Jones, 299 Broadway, New York.

NOVEMBER 1-3.—CHICAGO, ILL.
The American Municipal Association. (Stevens Hotel.) Address: 1313 E. 60th St., Chicago, Ill.

NOVEMBER 2-3.—UTICA, N. Y.
American Water Works Association—New York Section. (Hotel Utica.) Sec., R. K. Blanchard, 50 W. 50th St., Chicago, Ill.

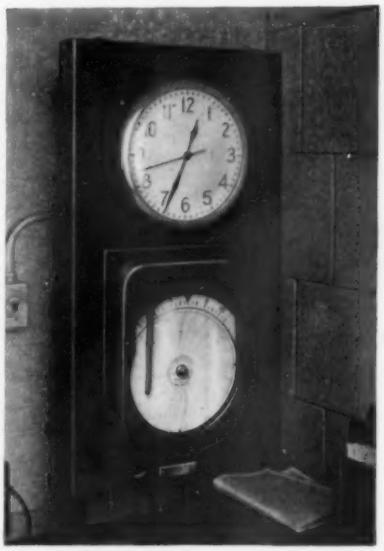
NOVEMBER 6-8.—CHARLOTTE, N. C.
American Water Works Association—North Carolina Section. (Hotel Charlotte.) Sec., R. S. Phillips, 206 Dacian Ave., Durham, N. C.

NOVEMBER 22-24.—NEW ORLEANS, LA.
National Association of Housing Officials. Dir., Coleman Woodbury, 1313 E. 60th St., Chicago, Ill.

JANUARY 29, WEEK OF, 1940.—CHICAGO, ILL.
American Road Builders' Association. (Int'l Amphitheater.) Engr.-Dir., Charles M. Upham, 952 Nat'l Press Bldg., Washington, D. C.

. . . at any distance from pipe line without sacrificing accuracy

THIS illustration of a Cochrane Electric Flow Meter indicates how convenient it is to have a visible record available at all times by locating this meter in the office on our attractive panel.



Use of Cochrane Electric Flow Meter permits installation of the instrument at any distance from the pipe line, without sacrifice of accuracy, and adds greatly to the convenience of the operating engineer.

Write for Publication 2096

COCHRANE CORP., 3118 N. 17th St., Philadelphia, Pa.

COCHRANE

VALVES • TRAPS • SEPARATORS • SPECIALTIES

Underground

PIPE AND CONDUIT LINES

as by Magic!

So quickly and so efficiently does the Hydrauger install Underground Piping that it seems like Magic! No ditching, no pavement cutting, no backfills, no after-settling; that's Hydrauger's way of saving 90% on every underground pipe installation. It bores a clean open-hole horizontally under pavements, traffic, gardens, railroads, embankments—right through sand, clay, conglomerate, rock, shale or any underground formation. Pipe slips through this hole readily and without damage to its protective wrapping or coating. Hydrauger operates economically and does not hazard vehicular traffic in any way.

New HIGH POWERED MODEL 2A-2X (Patented)

Operated by a powerful air-motor. Can bore 4½" hole at a foot per minute! Target "sighting" controls boring accuracy.

HYDRAUGER CORP., Ltd.
116 New Montgomery Street
SAN FRANCISCO
Send for Bulletin No. 5

HYDRAUGER
The Mechanical Gopher

LEADITE

FOR JOINTING CAST-IRON WATER MAINS

Melted and Poured ***No Large Bell-holes to Dig***

Saves at Least 75%

Leadite is shipped in powder form, packed in sacks of 100 lbs. net each
Leadite tested and used for over 35 years • Leadite joints improve with age

Be sure it is Leadite and accept no imitations

THE LEADITE COMPANY
Girard Trust Co. Bldg., Philadelphia, Pa.

No Caulking

RUSTOP

Eliminates necessity of painting below overflow.

The cathodic method of eliminating and preventing rust in STEEL WATER TANKS. **Cleans old tanks. Keeps new tanks clean.**

Used by many cities and manufacturers. Write for list.

ELECTRO RUST-PROOFING COMPANY
(Patents Pending)
Third National Bldg., Dayton, Ohio

Rensselaer
CONE VALVES
(Patented Hydraulic Operating Device)

Used for

- ALTITUDE CONTROL
- PRESSURE RELIEF
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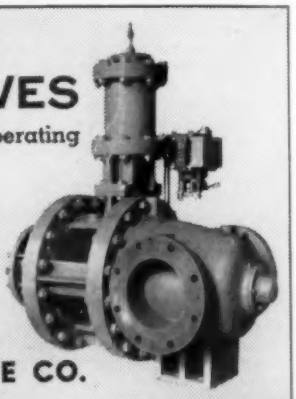

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TROY, NEW YORK

GET A BETTER JOB AT LESS COST

With

Hotstuf

WRITE US FOR BULLETINS

MAINTENANCE EQUIPMENT
ASPHALT HEATERS
TOOL & SURFACE HEATERS
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TRAILER TOOL BOXES FOR SERVICE DEPARTMENTS

MOHAWK ASPHALT HEATER CO.
Frankfort New York

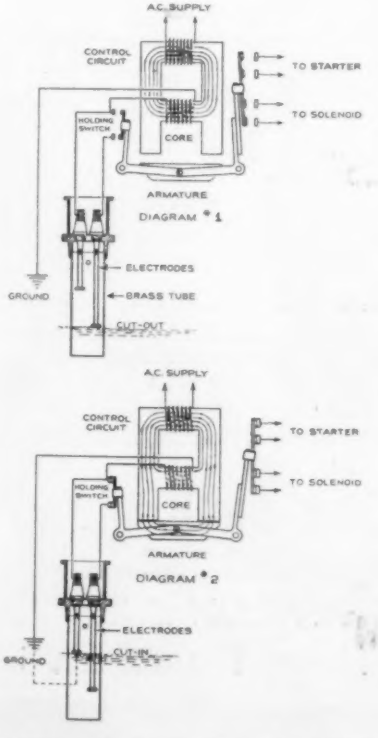
News and Illustrations

Items of Interest to City, Town and County Officials, and Others Concerned with the Economical Construction and Efficient Operation of Public Improvement Undertakings

Floatless Control of Liquid Levels

A system of control for levels of liquids in basins and elevated tanks which does not involve the use of floats has been in successful service for more than five years. The B/W system of induction relay switches of the Bender Warrick Corporation, Birmingham, Mich., operates with no moving parts in the liquid, and is reported to be unaffected by pressures or temperatures and to operate on variations in levels from ¼-inch upward.

The control consists of an electrically operated relay and two electrodes which are suspended in the water. The rising and receding water level opens or closes the circuit in the relay, which has a very small and limited current induced in it but has no direct connection to the main power circuit. Diagram 1 shows an exciting coil connected to a permanent source of alternating current only. The maximum input to this coil is 3.5 watts. Around the lower bar of the core is a control coil, which serves by means of the induced current generated in it to control the operation of the relay. The maximum current generated in the coil is 40 milli-amperes. The legs of the core act as poles to attract the armature below. The movement of this armature is utilized to open or close two pole contacts.



Diagrams Showing the Operation of B/W Induction Relay Switches Operated by Water Levels and Without Floats

A Combination Walter Snow-Plow and Wrecker Truck in the Service of the Triborough Bridge Authority of New York on the New Whitestone Bridge

Current passing through the exciting coil sets up a magnetic flux in the core. This flux circulates the shortest path, which is through the lower bar, which sets up a potential in the control coil, though no current flows unless a contact is made between the leads from the control coil. When the control circuit is completed, a flow of current is established which creates a counter-magnetic flux in the lower core bar, diverting the primary magnetic flux to the poles of the core and drawing the armature forcibly to the poles. Breaking the control circuit permits the magnetic flux to pass through the bar again, releasing the armature.

The B/W control is completely described and illustrated in Bulletin No. 40 which may be secured direct from the Bender Warrick Corporation, by mentioning this item.

New Roller Improvements

Two new improvements in the Hercules Ironeroll road roller have recently been announced by the Hercules Co., Marion, Ohio. The old-style bevel reversing gear for controlling the forward and reverse movement of the roller has been replaced by spiral tooth gears which give smoother, quieter and longer operation. The gears are of alloy steel, with cut teeth, and heat-treated. The result of using these spiral gears is increased rolling hours and more efficient operation with a marked reduction in maintenance cost, according to the manufacturer.

Another improvement incorporated in the rollers is the hinging of the engine hood. Formerly the hood was made in one piece and was quite difficult for one man to remove. The hood is now divided and hinged similar to automotive types and can be raised from either side of the roller by one man. This feature materially increases accessibility to the motor for necessary adjustments.

A new bulletin, No. H-3910, just issued as a supplement to the Hercules general catalog No. H-3801, describes these new features of the Ironeroll roller as well as outlining its other features. Copies of either or both of these catalogs may be secured direct from the manufacturer by mentioning this magazine.

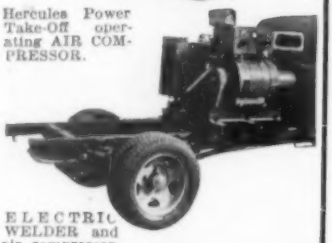
Notes on Stabilizing Lime-Softened Water

Recarbonization, the process of stabilizing lime-softened water through the addition of carbon dioxide gas, is the subject of Bulletin 1300 recently issued by International Filter Co., 325 West 25th Place, Chicago, Ill. Water softened with lime ordinarily becomes slightly supersaturated with calcium mono-carbonate and magnesium hydrate. Unless these are converted to soluble forms or "stabilized," they will deposit upon contact with distribution systems, heaters, etc., and will crystallize or deposit on the sand in filters, building these grains to such a size that they lose their efficiency. Through the addition of carbon dioxide to softened water, excess hydrate alkalinity is converted to normal carbonates, and equilibrium is restored.

Infilco recarbonators, described in the bulletin, together with much available information on the process, are available for all types of water-softening plants in which lime is used for treatment. Each recarbonator consists of units for producing, cooling and scrubbing, compressing, drying and applying carbon dioxide gas to the softened water.

HERCULES SPLIT SHAFT POWER TAKE-OFFS

Will Save Your City Money!



Hercules Power Take-Off operating AIR COMPRESSOR.

ELECTRIC WELDER and air compressor operated by Hercules Power Take-Off.

Save by speeding up work. Save by lowering equipment investment and operating costs.

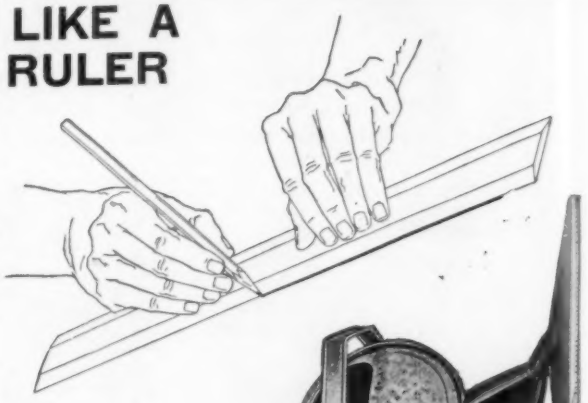
Hercules Power Take-Offs operate truck-mounted equipment direct from truck motor using ALL its power. Eliminates investment, upkeep and operating cost of auxiliary motors.

Three types and two sizes of each type—heavy and medium duty.

Write for **FACTS!**

HERCULES STEEL PRODUCTS CO.
GALION, OHIO, U. S. A.

LIKE A RULER



With the Dolge Straitline Sprinkler, you get better control of weeds. Exclusive boom with holes in straight line controls flow of chemical. Works with knife-like precision. Keeps chemical off ornamental shrubbery and good grass.

In combination with Dolge Weed-Killer, you can get the Straitline Sprinkler on money-saving service terms. Write for complete details and quotations. Now, please.

The C. B. DOLGE Co.
WESTPORT CONNECTICUT

TAKE THE BANG

OUT OF MANHOLE COVERS with

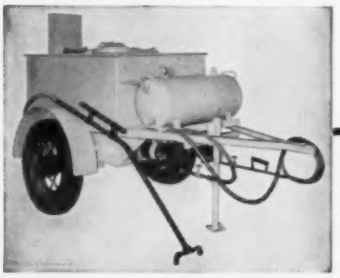
TAPAX

Put TAPAX—sticky side down—on flange. Replace cover.

Quick - Easy - Lasting - Economical

WRITE FOR THE STORY OF TAPAX AND TRIAL OFFER

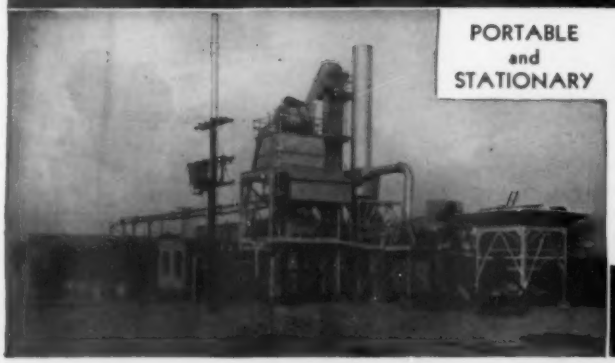
TAPAX MFG. CO., Inc.
203 HOYT AVENUE MAMARONECK, N. Y.



ASPHALT and TAR KETTLES
Fire Proof—Oil Burning
Hand and Motor driven spray.
Many sizes. Write for catalog.

Elkhart **White Mfg. Co.** Indiana

ASPHALT MIXING PLANTS



PORTABLE and STATIONARY

ALL SIZES

FOR HOT AND COLD MIXES

REPRESENTING THE NEWEST DEVELOPMENTS *in* ASPHALT PLANT ENGINEERING

HETHERINGTON & BERNER INC.
ENGINEERS AND MANUFACTURERS
701-745 KENTUCKY AVENUE • INDIANAPOLIS, INDIANA

The Daunt Senior Luminaire

Better Street Lighting on Present-Day Budgets

Today's close budgeting demands that every precaution be taken to avoid unnecessary excessive maintenance costs in street lighting. The Daunt Corporation, 42-37 13th Street, Long Island City, N. Y., has taken unusual precautions to insure protection against the hazards of the elements.

The Daunt luminaire consists essentially of the cast aluminum head, in which is the pipe tap and an area in which any water, vapor or rain is caught and finally evaporated by the heat of the lamp itself. Within the cast aluminum head are the bayonet catch and pins for the incandescent bulb and then a spun aluminum housing with a gasket and hinge at the bottom which retains the heat-resisting non-glare clear rippled globe held securely in place by a white metal globe ring and lock bolts. This ring fits against the white metal housing ring above which is the Alzak aluminum reflector. The Daunt Senior Design 31-S illustrated is one of the more recent Daunt luminaires, which made its initial bow only six months ago with the Aristo-Lite and the Junior luminaire. All these are described and illustrated in a new folder, "Lighting the Way to the World of Tomorrow," which may be secured direct from the manufacturer.

Lawn Irrigation from Concealed Heads

The Skinner System of lawn irrigation waters the lawn by the turn of a valve. A system of underground piping supplies water to sprinkling heads set flush with the surface of the ground and so spaced as to secure complete coverage. The lawn area can be divided into units, each controlled by a single valve conveniently located. The size of the unit is determined by the water supply and the available pressure. The Junior Line of spray heads made by The Skinner Irrigation Co., Troy, Ohio, provides an adequate watering system in simple form and at moderate cost.

The Junior heads are of heavy, sturdy, dependable construction, made of brass, and give full circles of fine uniform spray. The angle of spray is high enough to facilitate clearance from grass, and the angles of spray are identical on all heads, permitting the use of various coverage heads in one installation with uniformity of appearance. The volume adjustments are internal, avoiding any raggedness of the stream. Half- and quarter-circle heads are built with especially designed deflector nozzles, with the edges of the stream slightly reinforced to counteract, as fully as possible, the wind deflections.

Catalog JR-234 describes the Skinner System Junior lawn spray heads in detail. Copies may be secured direct from the manufacturer or through this magazine.

Northrop & Co. to Represent Clark

The H. W. Clark Co., Mattoon, Ill., announces the appointment of Northrop & Co., Inc., 50 Church Street, New York, as exclusive sales representatives in the eastern states. Northrop & Co. will handle inquiries and distribute literature for the well-known Clark line of meter boxes, valve casings, meter testers, meter yokes, service and valve boxes, municipal and special castings.

You can't get rid of

SLIMY SAM SEWER SLUDGE

with a shovel—

You gotta have an OK Champion Sewer Cleaner to clean out your sewer mains.

The hand models will get him positively, but the power machines will do it faster. You don't want to send men down to spend all day in the sewer when it isn't necessary. You can't endanger the health of your citizens by dirty sewers when the remedy is so easy. Your expensive sewage disposal plant can't do its best work when sewers are dirty and costly damage to the plant happens regularly with dirty sewers.

Many years of rains washing down street dirt, cinders, bricks, etc., eventually fill up any sewer. Finally comes the day of flooded basements, damage suits and hurry-up, unsatisfactory, emergency, temporary cleaning.

New York City, Atlantic City, Flint, Little Rock, Bay City, Duluth, Westfield, Jersey City, Akron, Midland, Gary and hundreds of other cities keep their sewers at full efficiency by routine machine cleaning with OK Champion equipment. The cost is very low.

Why not get your copy of OK Champion literature, now ready for you?

CHAMPION CORPORATION
4716 Sheffield Ave., Hammond, Ind.

Peerless *announces*

amazing new line

1940

PUMP MODELS

Every year Peerless has brought forth many new and improved Turbine Pump refinements. Now, months ahead of the new year, Peerless announces still greater advances in design and construction.

The **new 1940** Peerless Pumps are actually years ahead of contemporary makes. For instance, the new Peerless "Hi-Lift" Pump is the most revolutionary improvement ever devised for deep well pumping. Its construction is utterly different.

Know what's **latest** in pump equipment. See the new Peerless line. Compare! Check every feature point by point. Don't install an obsolete pump when you can purchase a 1940 Peerless for the same price.

Our 1940 Catalog is fresh off the press. It gives advance details; shows more than 100 features that place Peerless Pumps further in advance than ever before; illustrates the entire line including Oil-Lubricated and Water-Lubricated Types. Write for a copy NOW!

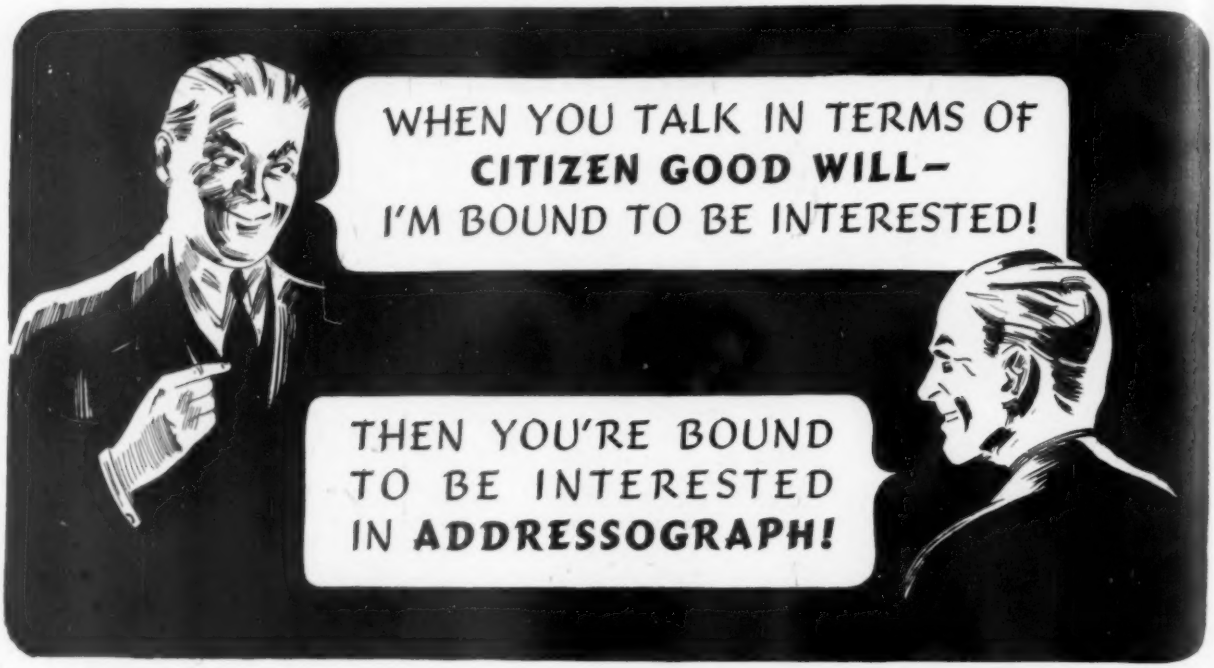
Factories:
Los Angeles, San Jose, Fresno, Calif.
Massillon, Ohio

★ WATER OR 1 OIL LUBRICATION

Peerless
TURBINE PUMPS

PERFORMANCE WITH ECONOMY

Peerless Pump Division
Food Machinery Corporation



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PAYROLL FORMS
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PLAN TO VISIT THE ADDRESSOGRAPH-MULTIGRAPH EXHIBITS AT NEW YORK WORLD'S FAIR AND GOLDEN GATE INTERNATIONAL EXPOSITION

CITIZENS are quick to "point with pride" when their municipal affairs are being handled efficiently. By the same token, their good will is easily lost when errors, omissions, misspelling and illegibility occur in writing names and data on bills, receipts and other forms.

Addressograph eliminates these hazards . . . completely. An entire record is copied with *one swift motion* and with *unfailing accuracy. No checking is required.* Procedure is simplified. Peak loads are leveled. Time and money are saved. Citizens' approval of such methods is often reflected in their loyal support of those municipal officers who apply them.

Investigate! See the latest Addressograph developments. Learn how other municipalities are using these methods so successfully. Get in touch with your nearest ADDRESSOGRAPH SALES AGENCY or mail the coupon for further information.

ADDRESSOGRAPH-MULTIGRAPH CORPORATION
Cleveland, Ohio
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Sales Agencies in Principal Cities

MAIL COUPON TODAY AC-4

Addressograph-Multigraph Corporation
Euclid Post Office, Cleveland, Ohio
Please send me complete story of Addressograph Methods.

Name.....*Municipality*.....

Address.....*City*.....*State*.....

*Addressograph is a trade mark registered in the United States Patent Office

The New Royer, Jr., Shredder That Handles Dried Sewage Sludge

New Compost Mixer Aerator and Loader

A new light-weight, easily portable, low-cost compost shredder-mixer-loader, known as the Royer Jr., has been announced by the Royer Foundry & Machine Co., Kingston, Pa., for use by sewage-treatment plant operators. Re-designed to reduce the cost and lower the weight, it is claimed that the new model retains all the features of the older types, including thorough mixing, shredding and aerating of compost, loam, leaf mold, dried sludge and other fertilizing materials. Added to this, wagons, trucks or boxes can be loaded in the same operation.

The capacity of the machine per hour is as much as one man can shovel. The low shoveling height, with controlled direction of discharge of shredded material, is featured. It has a capacity of 3 to 4 cubic yards of compost per hour and is driven by a 110-220-volt, single-phase, 60-cycle, 1,750-rpm motor. It has a net weight of 270 pounds. Complete information may be secured from the manufacturer at 158 Pringle Street, Kingston, Pa.

Livingston Heads Media Dept. of Pittsburgh Agency

Ketchum, MacLeod & Grove, Inc., 2000 Koppers Building, Pittsburgh, Pa., has announced the appointment of C. E. Livingston as Manager of its Media Department. Mr. Livingston is a graduate of Princeton University and of the Harvard Graduate School of Business Administration. He has had eight years of actual experience in research and analytical work.

News from Cutler-Hammer

Cutler-Hammer, Inc., 315 North 12th Street, Milwaukee, Wis., has just announced the appointment of B. M. Horter as General Sales Manager. Mr. Horter will have direct supervision of sales for the company through its 24 selling territories in this country.

Prior to his new appointment, Mr. Horter was in charge of the Resale Sales Division at the Milwaukee Headquarters.

Leeds Becomes Chairman of Leeds & Northrup

Morris E. Leeds, founder and President of the Leeds & Northrup Co., 4911 Stenton Avenue, Philadelphia, Pa., is assuming the position of Chairman of the Board of Directors, and Charles S. Redding, Vice-President in Charge of Research and Engineering, has become President, in an expansion of the company's new executive set-up. Chairman of the Board is a post newly created to facilitate Mr. Leeds' participation in policy matters with which he will continue active.

Modified Tractor Shovel Announced by Hough

A special modified tractor shovel for use with T-35 and TD-35 TracTracTors has been announced by The Frank G. Hough Co., 919 North Michigan Avenue, Chicago, Ill. The pump, cylinder and controls making up the hydraulic system of this shovel are of heavy-duty foolproof design providing long-time service with a minimum of maintenance, according to the manufacturer. There are fingertip controls conveniently located for hoists, dumps and lowering operations, and the bucket relatches as soon as it is returned to the lower position. There are no clutches and no brakes on this shovel.

The Hough hydraulic shovel loads 40 to 50 yards of loose material per hour and can be used to excavate and dig an average-size basement in a day or less with clean, sharp corners and straight walls. The ¾-yard bucket is built of heavy steel plate and is fitted with a heavy carbon cutting edge. The bucket raises about 9 feet in 11 seconds or less, and has a maximum dumping clearance of 7 feet, which is high enough to clear the sides of average trucks and wagons. The frame of the shovel is of heavy structural steel, welded, braced and cross-braced. The shovel complete without the International tractor weighs 4,400 pounds. Extra equipment for this unit includes a backfiller blade 36 x 84 x ½ inches with a high carbon cutting edge and a 1-yard snow bucket made of 3/16-inch steel and 72 inches wide. Complete information will be found in Bulletin No. 114.

The Special-Modified Hough Hydraulic Shovel Mounted on a T-35 TracTracTor

Use a
SMITH AIR
COMPRESSOR

Save
MONEY, TIME
AND SPACE

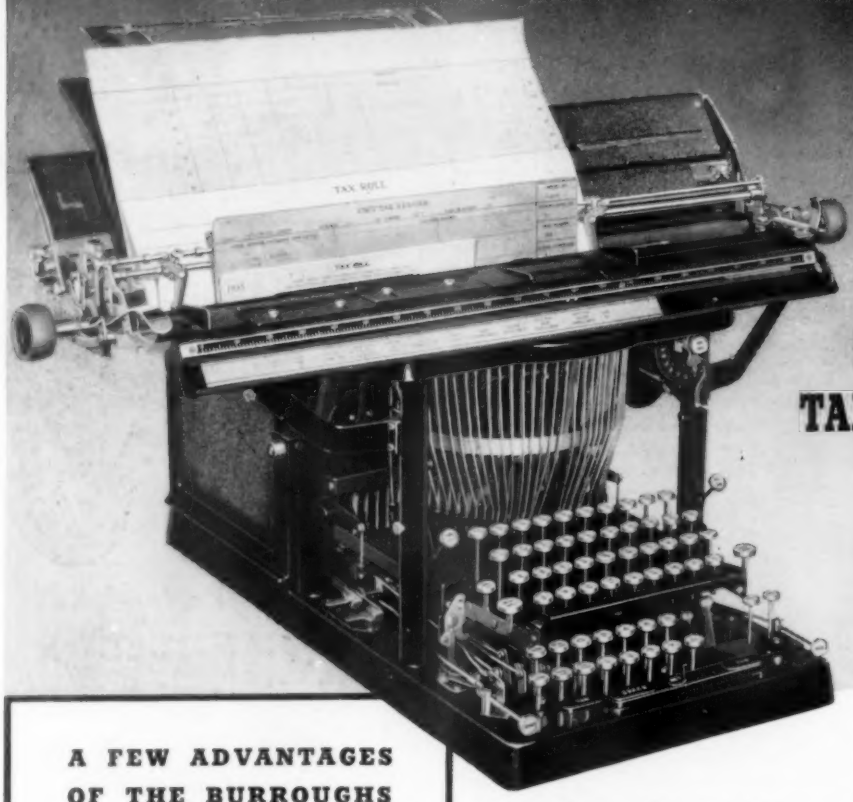
An extra margin of sturdiness, reliability and long life is built into a Smith Air Compressor. They're used the world over to replace expensive, cumbersome compressors on a majority of all compressor work. Sixty cubic feet a minute capacity —all the power you'll need to operate rock drills and paving breakers. Pressure up to 175 lbs. a square inch. Head equipped with high-speed compressor valves; automatic unloading and idling. Uses only one gallon of gasoline per hour. Tow it, if you like, at permissible truck speeds.

With a Ford Motor and shop facilities you can assemble your own compressor. We will furnish a Smith Compressor Head and Accessories with instructions for mounting.

Write Today!

GORDON SMITH & CO.
425 COLLEGE STREET
BOWLING GREEN, KY.

SIMPLIFIED TAX ACCOUNTING BY DIRECT METHODS



with BURROUGHS TAX ACCOUNTING MACHINE

A FEW ADVANTAGES OF THE BURROUGHS SIMPLIFIED TAX ACCOUNTING PLAN

All information on each parcel of property is in one place—any account can be quickly audited, and service to taxpayers is accelerated.

Duplicate bills for collection follow-up can be easily prepared.

Trial balances may be obtained at any time.

Provides an efficient and convenient method of billing annual installments and accrued interest on special assessments.

Furnishes positive control over both current and delinquent charges.

Flexible—readily adaptable to local requirements.

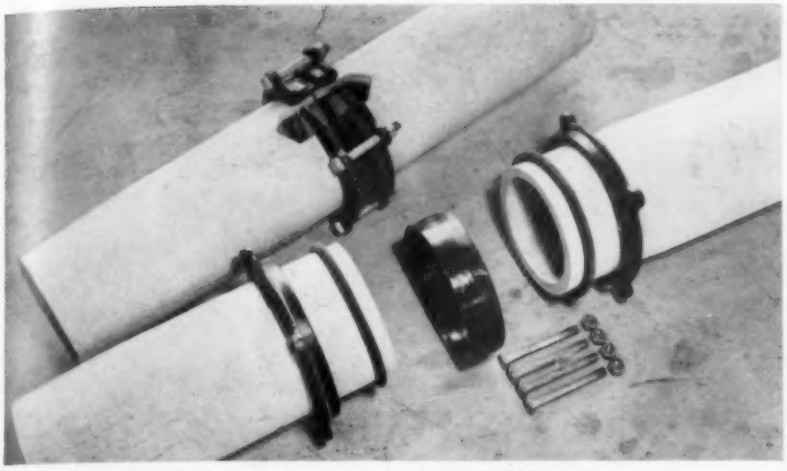
The Burroughs Tax Accounting Machine prepares the Tax Roll, Tax Bill and Tax Ledger *in one operation*—computing the taxes by direct electric multiplication, and accumulating page totals. All three records, including the computations, are completed with fewer key depressions than are required to copy *one record* on an ordinary typewriter! Proper accounting controls are maintained throughout the posting operation.

Ask your local Burroughs office for complete facts about simplified tax accounting by direct methods and Burroughs Tax Accounting Machine. Or, if more convenient, write direct to—

BURROUGHS ADDING MACHINE COMPANY
6678 SECOND AVENUE, DETROIT, MICHIGAN

Burroughs

When you write for that catalog, kindly mention THE AMERICAN CITY.



K & M Century Pipe, Showing the Method of Making Tight Joints

The Manufacture of Asbestos-Cement Pipe

The manufacture of Century asbestos-cement pipe begins with the selection and preparation of the asbestos fiber, which, when converted into fine, clean fibers suitable for reinforcing portland cement, is mixed with water and cement in measured quantity, forming an asbestos-cement slurry, and then is passed on to a pipe-making machine. The Dalmine pipe machine, used by Keasbey & Mattison Co., Ambler, Pa., applies a series of thin asbestos-cement films spirally to a mandrel until the correct wall thickness is built up. During the manufacture of the pipe, hydraulically operated pressure rolls position the mandrel, control its transverse progress through the machine and hold it in contact with the film-coated felts, pressing each layer tightly against the one beneath it.

On leaving the machine, the pipe is calendered and permitted to set on its own mandrel to insure perfect circularity. When it has set sufficiently to permit handling, the mandrel is removed and the pipe undergoes a curing routine which enables the asbestos-cement material to develop its full strength. It is then inspected and gaged for wall thickness, smoothness and regularity of bore and straightness. Finally, it is trimmed to length, the ends are machined, and the pipe is stored.

This process of manufacture and the features of Century flexible couplings giving permanently tight joints are described in a well-illustrated 32-page catalog, Form A.P. 3, which may be secured free on request.

Foreign Meter Producer Visited A.W.W.A. Convention

Torsten Montelius, of Stockholm, Sweden, the active head of the Akteibolaget IMO Industrie, was an interested visitor at the recent American Water Works Association convention in Atlantic City, N. J. Mr. Montelius came to the United States in the interests of the IMO meter, which is being manufactured in this country under exclusive license by the Pittsburgh Equitable Meter Co. While at the convention, Mr. Montelius was the guest of Colonel W. F. Rockwell, President of the Pittsburgh firm and also President of the Water Works Manufacturers Association.

Good Roads Takes Over Manufacture of Dumpers

Good Roads Machinery Corporation, Kennett Square, Pa., has been granted exclusive rights for the manufacture and sale of the Speed Dumper truck hoist and multiple bucket equipment originated by Speed Dump, Inc., New York City. Demonstrations of Speed Dumpers for loading, hauling and dumping earth, rock, and similar materials are being given throughout Good Roads' eastern territory.

Engineers Celebrate Twenty-Fifth Anniversary

Fay, Spofford & Thorndike, consulting engineers, Boston, Mass., celebrated the twenty-fifth anniversary of the formation of the firm on July 1 by holding open house at the Engineers Club in Boston.

Partners of the firm include Frederic H. Fay, Charles M. Spofford, John Ayer, Bion A. Bowman, Carroll A. Farwell, and Ralph W. Horne. The principal engineers include E. B. Myott, H. J. Williams, W. L. Hyland and F. L. Lincoln.

Picking the Right Tire for Trucks and Tractors

An operator's handbook containing valuable information on truck, bus, trailer, tractor and implement tires has recently been issued by The B. F. Goodrich Co., Akron, Ohio, and is available to readers of this magazine free on request. The booklet contains 96 pages of valuable information on the inflation of tires, character of tires, sizes and treads.

SAF-T-EYE

Knowledge Is Safety

If we know the danger, we know how to be safe—at least as safe as possible under the circumstances. Night driving is more hazardous than day driving, because we have less knowledge of the road.

Provide the night driver with more information, and the night accident rate will rapidly decrease.

USE SAF-T-EYE

Products for Night Driving Safety

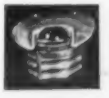
1. Box dangerous intersections with SAF-T-EYE road markers.

2. Mark railroad crossings with an "X" in the lane of traffic.

3. Mark center line of road where foggy conditions prevail and where dangerous curves exist.

4. Mark islands with curb markers and also mark curbs in the same manner through parkways, etc.

5. Use permanent opal glass street markers for parking lanes and pedestrian crossings.



6. The SAF-T-EYE road marker is also made in a style that is replaceable, if preference dictates such type. This replaceable style can be removed and a cap inserted.

7. For one-way streets or roadways where reflection is required in one direction only, we have the SAF-T-EYE city traffic marker. This marker is also of value in marking pedestrian crossings.

8. For safety zones, such as street car safety islands, use SAF-T-EYE Saf-T-Zone marker.

9. Use light reflecting intersection markers as a warning and to prevent cutting corners.

SAF-T-EYE CO., INC.
c/o The Phoenix Glass Co.
Monaca, Pa.

Gentlemen:

Kindly send additional information with reference to

No. 1 ☐ No. 2 ☐ No. 3 ☐
No. 4 ☐ No. 5 ☐ No. 6 ☐
No. 7 ☐ No. 8 ☐ No. 9 ☐

Name .....

Address .....

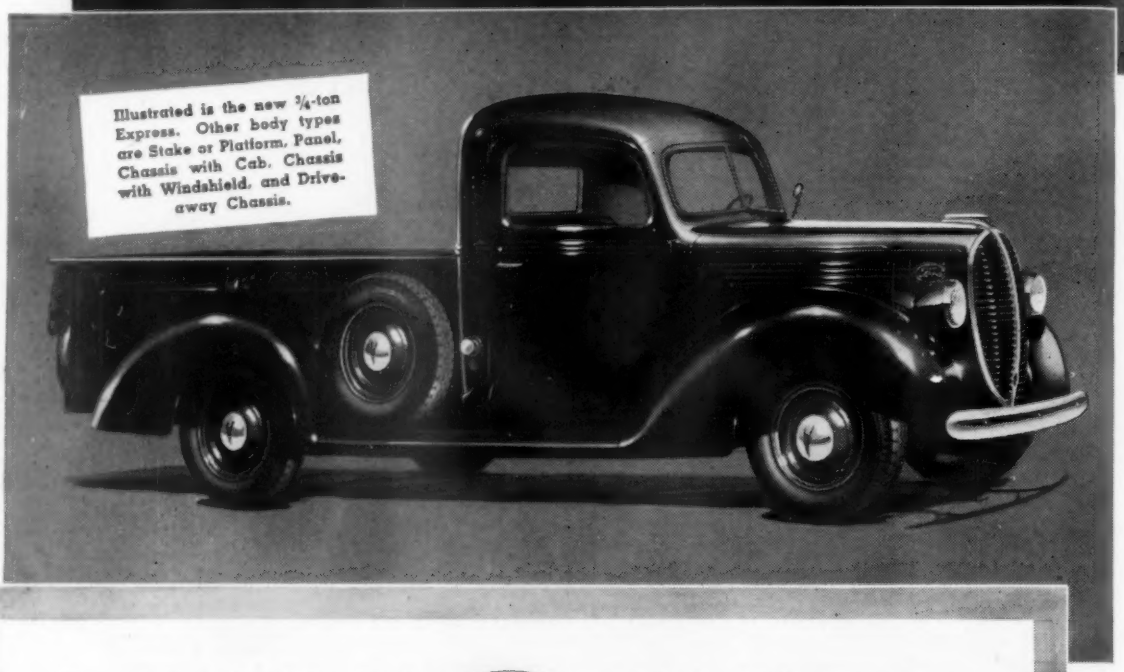
City .....

A BRAND-NEW MEMBER

BROADENS THE LINE OF FORD V·8 TRUCKS

THE ¾ TONNER

122-inch wheelbase—60 or 85 horsepower V-8 engine


Illustrated is the new ¾-ton Express. Other body types are Stake or Platform, Panel, Chassis with Cab, Chassis with Windshield, and Drive-away Chassis.

The new Ford V-8 ¾-ton Truck brings to the hauler of lighter loads a better opportunity than ever to choose a unit exactly fitted to the needs of his job in power, size and body type.

The new truck is low in price, with exceptionally large body dimensions that will appeal to any one whose loads are in the ¾-ton range.

It is sturdy, carefully designed and well built. All ¾ Tonners have full-floating rear axles. Ask any Ford dealer to arrange a free "on-the-job" test for you.

The Ford V-8 line now includes Commercial Cars, ¾ Tonners, One Tonners, Regulars, and Cab-Over-Engine models. 48 body and chassis types, 3 V-8 engines, 6 wheelbases and a wide selection of optional equipment.

FORD V·8 TRUCKS

FORD MOTOR COMPANY, BUILDERS OF FORD V-8 AND MERCURY CARS, FORD TRUCKS, COMMERCIAL CARS, STATION WAGONS AND TRANSIT BUSES

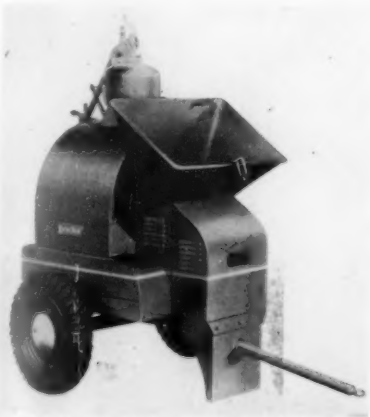
Guards for Guy Wires a Real Safety Measure

Most cities have ordinances requiring protective guards on the guy wires of telephone and other poles carrying wires through city streets, to prevent accidents. The guy cables for large derricks on construction projects are a hazard and should be made particularly visible to individuals and operators of mobile equipment, including trucks, so as to prevent accidents. The Overton Flexibal guy guard is an easily installed, readily visible protective device made by S. E. Overton Co., South Haven, Mich. It consists of spindles 6 inches long and 2¼ inches in diameter, made of seasoned hardwood and finished with durable aluminum paint. They are so slotted as to slide over the guy wires and then are held in place by two hot-dipped galvanized nails which are inserted in drilled holes. A set consists of fourteen spindles and one positive cable clamp for a 7-foot guard length.

When in place, these Flexibal guards form a series of bead-like spindles carried to the required height and do not require maintenance. The only tool required for their installation is an ordinary hammer. The roller-shaped spindles are readily visible both day and night, and when struck in any manner their rounded surface makes injury improbable.

A New 3½-S Mixer of the Non-Tilting Type

Koehring Co., Milwaukee, Wis., has recently announced a new 3½-S non-tilting mixer built by its subsidiary, the Kwik-Mix Concrete Mixer Co., Port Washington, Wis. The outstanding feature of design is the absence of a drum ring-gear, drum drive pinion and countershaft. The drum is driven by the rubber drum rollers, reducing noise, vibration and excessive maintenance costs, making the machine ideal for work in densely populated districts. The mixer is easily handled by one man, has a low shoveling height, a wide hopper and fast discharge, and weighs only 980 pounds. It is described and illustrated in detail in a new 4-page bulletin which will be sent free on request.



The New 3½-S Non-Tilt Kwik-Mix Concrete Mixer

Installing Flexibal Guards on a Guy Wire on a City Street

Cletrac Organization

The Cleveland Tractor Co., Cleveland, Ohio, has completely revamped its merchandising organization so as to take full advantage of the opportunity which its new small Cletrac crawler makes possible. Operations have been organized into four main divisions — manufacture, finance, merchandising and export. Each of three divisions is headed by a vice-president and the fourth by the treasurer. Each division head has had a long record of experience in his particular field, although with one exception they are young men.

Activities are headed by the newly elected Executive Vice-President, H. P. Mee, who comes out of retirement to reassume his established place as one of the most aggressive and successful merchandisers in the crawler tractor industry.

W. Ellzey Brown, Vice-President, is Mr. Mee's chief aid in charge of merchandising and all promotional activities, including advertising and service.

The head of the export division, which has in the past seen some of Cletrac's best promotional efforts, is Henry J. Leisenheimer. Mr. Leisenheimer has long been a Vice-President of the company, directing export sales with great success.

H. R. Chaffee, Regional Vice-President at New York, will direct business in the New England states, where he has already been very successful.

Sales activities in seven western states of the Pacific Coast region are directed by R. E. Anderson, Regional Vice-President.

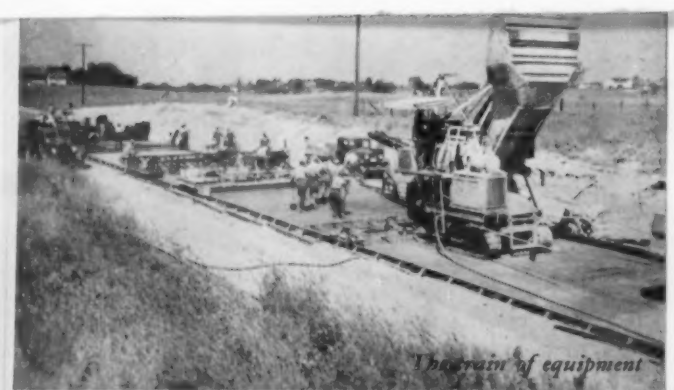
In the South Mr. Anderson will be aided by Chester J. Deutsch, the company's Southern California Manager, who will have charge of organizing that territory.

Another important member of the Cletrac operating committee is the company's Treasurer, E. M. Bell, a young man who has been with the company for several years and who, in collaboration with Mr. Mee, is in charge of finance, credit, accounting and collection problems.

Cletrac engineering and manufacturing is headed by J. G. Heaslet, who has directed these company activities for many years. Under him is J. E. Tom, Chief Engineer, who has spent most of his business life with Cletrac.

South Bend
31 YEARS EXPERIENCE
STREET FLUSHERS
●
STREET SPRINKLERS
●
GUTTER SNIPE
Pickup Sweepers
●
BITUMINOUS MATERIAL DISTRIBUTORS
●
MAINTENANCE UNITS
For Bituminous Surfaces
●
TRAFFIC LINE MARKERS
●
MUNICIPAL SUPPLY COMPANY
SOUTH BEND, IND.

TIGHTLY BOUND


The train of equipment

vious brick protects the softer and porous base just
the hard and impervious enamel of a tooth protects t
softer structure which it covers.

Monolithic grout-filled brick construction has alwa
had many supporters. Now vibration perfects and sim
plifies the construction—gives an ideal surface, and mak
a handsome reduction in cost.

Send for literature on Vibrated Monolithic Bri
Pavement Construction. Address National Paving Bri
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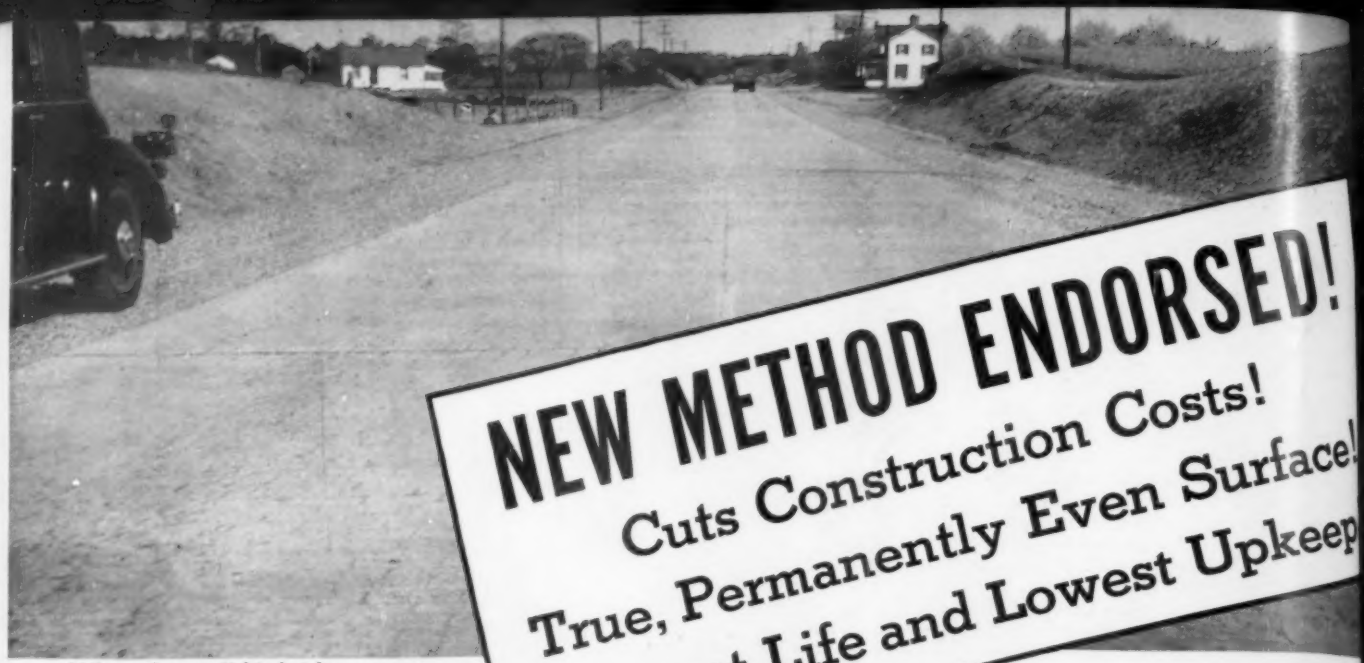
VIBRATED MONOLITHI

BRICK

FOR HIGHWAY SURFACE



Vibrated monolithic brick pavement on U. S. 21, Stark County, Ohio

NEW METHOD ENDORSED!

Cuts Construction Costs!

True, Permanently Even Surface!

Longest Life and Lowest Upkeep

Brick vibrating machine in operation

The train of equipment

● Using this new and approved construct method you can now build brick roads with a perf traffic surface at a substantially lower cost! It is cal vibrated monolithic brick.

Vibrating machinery, recently developed, makes t possible. In this method of construction, the brick a vibrated into the freshly placed concrete. Expansion a control joints are used. Grout filler completes the jo

Vibrated monolithic brick construction gives the lo upkeep and long life characteristic of brick. The surfa is permanently true and in alignment. The hard, impe vious brick protects the softer and porous base just the hard and impervious enamel of a tooth protects t softer structure which it covers.

Monolithic grout-filled brick construction has alwa had many supporters. Now vibration perfects and sim plifies the construction—gives an ideal surface, and mak a handsome reduction in cost.

Send for literature on Vibrated Monolithic Bri Pavement Construction. Address National Paving Bri Association, National Press Building, Washington, D.

VIBRATED MONOLITHI

BRICK

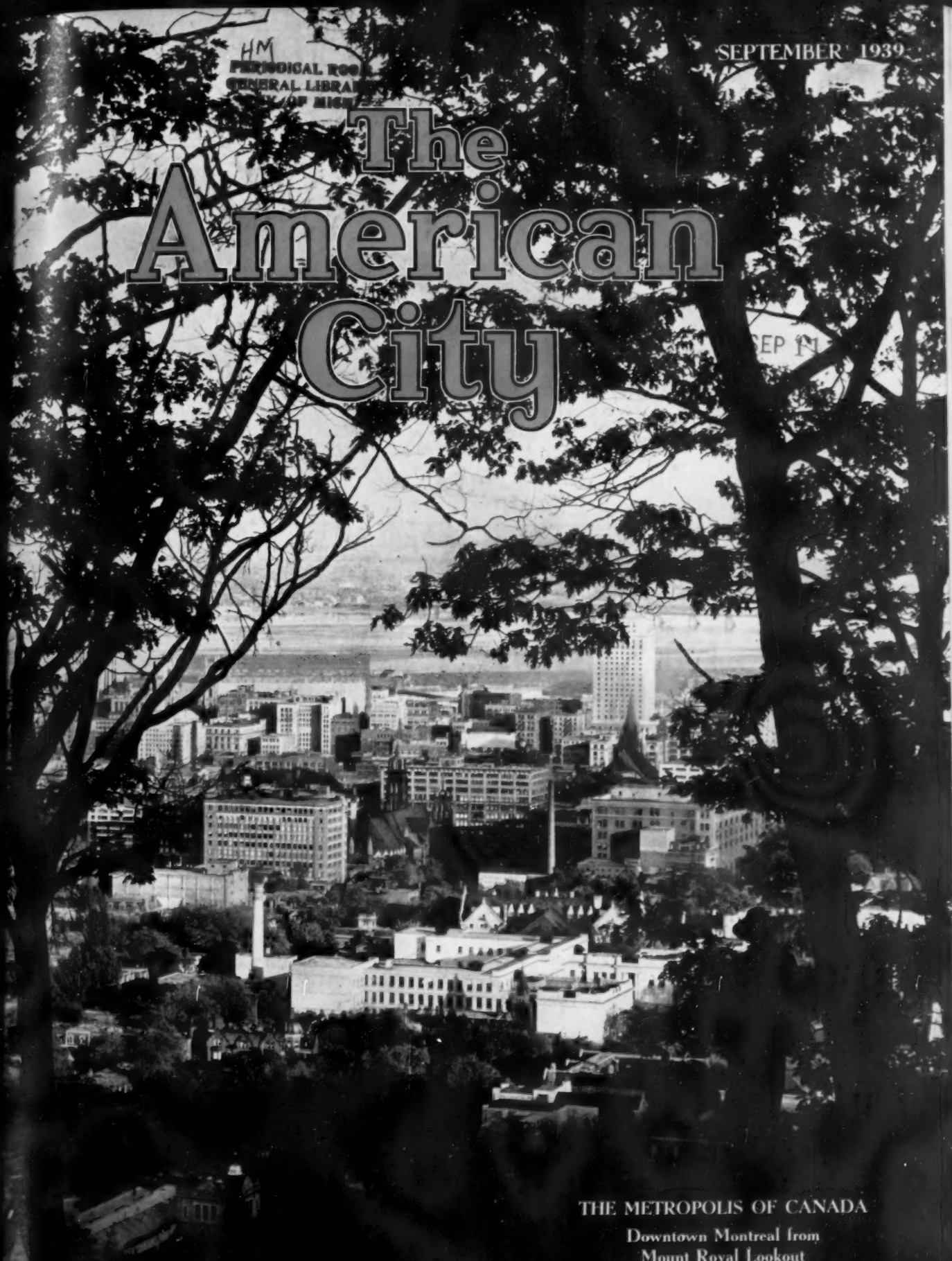
FOR HIGHWAY SURFACE

HM
PERIODICAL ROOM
GENERAL LIBRARY
OF MICH

SEPTEMBER 1939

The American City

SEP 1



THE METROPOLIS OF CANADA

Downtown Montreal from
Mount Royal Lookout